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REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1946.

It is not yet possible to afford space for a full review of the year's activities at Kew. This report will include only a brief statement of the more important items, but occasion will also be taken to refer to various matters connected with the war years which have not been recorded before.

STAFF. The following changes, additional to those mentioned in K.B.1, 1946, are recorded :—

MR. P. H. B. TALBOT has been appointed Botanist for the Union of South Africa, and took up his duties on 13th November, 1945.

MISS E. A. BRUCE resigned her post on 31st October, 1946, on appointment to the staff of the Division of Botany, Pretoria.

MRS. SPRAGUE (MISS M. L. GREEN) retired on 27th November, 1946.

It is a matter of satisfaction that the work of the Institution and DR. HUTCHINSON's contributions to taxonomy have been recognised by his election to the Fellowship of the Royal Society.

The Herbarium.

The last of the material evacuated from Kew for safe keeping during the war was brought back early in 1946, and the restoration of the Herbarium to its normal state was a task which took up all the available time of a much-depleted staff for the whole of the year. More than 1,200 standard cabinets, completely filled with specimens, had to be re-erected in addition to those which had been kept in the basement of the Herbarium, and the entire collection had to be re-spaced in the three wings of the building. It is hoped that the work of re-labelling the cabinets will be completed early in 1947, but during the whole period all parts of the Herbarium have been accessible to all persons requiring to make use of them.

Very little mounting has been done during the year, owing to shortage of staff. Some 40,000 sheets have been presented or purchased. Amongst important acquisitions are the Lester-Garland herbarium of

approximately 9,000 sheets, and the Dixon collection of British mosses (about 2,600 sheets). 5,261 specimens have been sent out from Kew as exchange or gifts, and 2,288 sheets on loan.

The destruction of the greater part of the Berlin-Dahlem Herbarium resulted in the loss of about 250 sheets of valuable material sent to Berlin on loan before the war.

An unsatisfactory feature is the difficulty and delay which is being experienced in restoring the Herbarium staff to adequate strength, which is resulting in great arrears of naming and accumulations of specimens awaiting mounting and distributing.

Visitors are again making use of the facilities of the Herbarium for study and research, though the number is as yet small in comparison with pre-war years. In particular, valuable research is being done by Dr. N. L. Bor (Indian Grasses), Dr. A. Parsa (Flora of Persia) and Mr. P. R. O. Bally (Flora of Kenya).

Arrangements have been made for a closer liaison between the Herbarium and Garden staffs. Different sections of the Gardens have been allocated, for taxonomic purposes, to members of the Herbarium staff, and the reciprocal advantages of such an arrangement are already evident, although shortage of staff prevents the full implementation of the scheme.

The Library.

Apart from general routine work, the time of the Library staff has been largely taken up with the rehabilitation of the Library after the return of the books evacuated during the war, the provision of extra shelf-room to meet the evergrowing demand for more space, and the endeavour to fill the war-time gaps in collections.

Accessions since the beginning of the war amount to about 850 volumes and 3,500 pamphlets and reprints.

The Gardens.

The rainfall for the year 1946 was over 30 inches, about 6 inches more than the average, and the increase proved very beneficial to the lawns and to trees and shrubs generally. The luxuriant growth of Conifers, especially *Chamaecyparis*, *Thuja* and *Cryptomeria*, was noticeable. By contrast, the rainfall for the four previous years, particularly the winter rainfall, was well below the average. The figures since the last record in the *Bulletin* are :—

1941	.. ..	29·24 inches
1942	.. ..	20·87 ,,
1943	.. ..	20·39 ,,
1944	.. ..	19·26 ,,
1945	.. ..	18·64 ,,
1946	.. ..	30·83 ,,

The unmber of visitors in 1946 was 1,567,954, an increase of about 200,000 over 1945, and this despite the inclemency of the weather during

the latter part of the year. The attendance figures since the last record in the *Bulletin* are :—

1940	822,928
1941	825,372
1942	1,230,241
1943	1,401,001
1944	911,494
1945	1,364,768
1946	1,567,954

A feature of the spring bedding display was provided by 30,000 Tulip bulbs which formed part of a thank-offering from the people of the Netherlands in recognition of Britain's effort during the war.

During recent years serious losses have occurred among the older trees at Kew, and in 1946 over a dozen large beeches had to be removed owing to their dangerous condition. It is becoming clear that many of the trees forming the original planting of Kew some two hundred years ago have reached their allotted span of life, though in some instances senescence may have been hastened by the recent series of abnormally dry winters. Other losses in 1946 were the best specimens of the Cricket Bat Willow, *Salix caerulea*, and of *Magnolia acuminata*.

Some large elms on the mound by the Ruined Arch were removed, as they were reaching a dangerous condition, and the opportunity was taken to replant with more colourful subjects.

A very rare occurrence was the flowering of *Elliottia racemosa*.

A clearance has been made of some of the Holm Oaks and Limes alongside the Kew Road Wall, south of the Victoria Gate ; their place is being taken by a large-scale planting of Camellias.

During the last two years a reconstruction of the Iris Garden has been carried out, with marked improvement in its design ; it now contains a good collection of modern varieties, including many new introductions presented by Iris lovers.

In 1944–45 a new Chalk Garden was constructed on the Ice-well mound, west of the Economic Houses, to furnish a much-needed habitat for calcicolous species, which moreover provides the means of cultivating a number of the rarer British plants.

In the Palm House the Cycads have grown during recent years to such an extent that they now require almost the whole of the south wing of the building. Cones were produced in 1946 on *Cycas revoluta*, *C. circinalis*, *Encephalartos hildebrandtii* and *Macrozamia spiralis*.

A very important addition to our Australian plants has been made by large collections of seeds specially sent by Captain and Mrs. Neil McEacharn, who travelled widely in Australia in search of material. Many of the seeds were sent to England by air, and we have been successful in raising from these recently harvested seeds many rare and difficult plants. Our special thanks are due to these good friends of Kew who have been instrumental in replacing many species lost through war damage to the Temperate House in 1940–1942, and introducing many others which have seldom or never been in cultivation at Kew before.

During the year a number of Student-gardeners returned from war service to complete their training at Kew, and there was also inaugurated

the Government's training scheme for ex-service men, whereby special one-year training courses are given to selected men at Kew, Wisley and certain other institutions. The employment of women gardeners has therefore almost ceased at Kew for the present, although it is intended to resume the employment of women when normal conditions return. It is proper to express here our great debt to the women who took service at Kew during the war. They replaced men in almost every section of the establishment and were efficient in every way. The demonstration allotment was run throughout the war by women staff, and is being continued under Miss I. Sanders, who has been in charge since 1945.

The exchange of plants and seeds with other institutions was naturally much reduced during the war. With the gradual restoration of postal and shipping facilities this activity is again expanding, though it is still far below the pre-war level. In 1946, 473 separate consignments of plants and seeds were received from other institutions, and about 10,000 packets of seeds were sent out, in addition to plants, cuttings, etc.

Twenty-one University Departments and Research Institutes have been furnished with material of some ninety species for purposes of research, apart from supply to individual investigators.

The Museums.

Much time has been spent in the restoration of the spirit specimens, which had been stored away during the war to reduce the fire risk. The collections are now once more in good order, but there have been few new acquisitions during the year. It has not yet been possible to re-open the North Gallery, which suffered considerable damage from a nearby bomb. Displays of selected pictures from Miss North's collection have been made from time to time in Museum 3. Some other special exhibits have also been made here, amongst them being plants of importance to beekeepers, and the potato (1946 marked the centenary of the great potato famine, due to blight, in Ireland).

The Vegetable Drugs Committee of the Ministry of Supply, on which Kew was represented, was dissolved on completion of its work; the final report of the Committee acknowledged the assistance of Kew in the organisation of the collection of medicinal plants and in the production of a standardised Rose-Hip Syrup. Kew has also co-operated in the preparation of Vegetable Drug monographs for the British Pharmacopoeia, and is to be represented by a member of the Staff on the newly-formed Drugs Requirements Advisory Committee of the Ministry of Health.

The Jodrell Laboratory.

An important activity has been the preparation of a new book on the systematic anatomy of the Dicotyledons (see Kew Bull. 1946, p. 3). This work, which has been carried out in collaboration with Dr. L. Chalk of the Imperial Forestry Institute, Oxford, is now nearing completion. The Assistant Keeper's principal helper at Kew has been Dr. C. L. Hare, who left in October to take up a post in the University of Liverpool.

Many routine identifications of timbers, fibres and other miscellaneous botanical material have been made, and with the steady expansion of the reference collection of microscope slides this work can now be carried out much more quickly. The Assistant Keeper continued to serve on the Pharmacognosy Sub-Committee set up by the Pharmaceutical Society for the revision of the British Pharmaceutical Codex.

Dr. E. K. Janaki, working chiefly with material cultivated in the Gardens, investigated the cytology of many ornamental and economic plants, especially Magnolias, Bamboos and species of *Philadelphus* and *Morus*. Her researches are now being continued at Wisley. Other visitors who worked at the Jodrell during the year included Dr. M. Skalinska (cytology and ecology of *Valeriana*), Dr. R. D. Gibbs of McGill University (types of lignification as revealed by the Marle reaction), Dr. L. Portheim (cultivation of Cacti in water), and Dr. M. Jepps, University of Glasgow.

Economic Botanist.

An important research carried out during the war (see Kew Bull. 1946, p. 3) concerned the raising of potato crops from " eyes " or chips, instead of from the whole " seed ". This work was completed in 1946, and the results confirmed previous findings. The crop from eyes may be reckoned as about 75 per cent of a normal crop. The quality is excellent, and there appears to be a larger proportion of ware than in a crop grown from whole sets.

The world shortage of food has directed attention to the need for intensifying food production in the Colonies, and at the request of the Colonial Office an investigation is being made into the possibility of introducing into parts of East Africa food crops that are grown in certain areas of Peru and Bolivia. Tubers of edible species of *Ullucus* and *Tropaeolum*, and seeds of *Chenopodium* and *Amaranthus*, have been obtained and grown to maturity at Kew for preliminary identification. It is considered unlikely, however, that any of these will be of great value, since both tubers and seeds are small, and it is probable that they are grown in the High Andes chiefly because climatic conditions are unfavourable to crops of higher quality.

Amongst the oil seeds investigated in 1946 was one from Germany called " samens " of which the Germans made great use during the war ; this proved, on cultivation at Kew, to be *Impatiens roylei*. Interest has been shown in a brush-fibre plant, *Agave lechuguilla*. Plants of this species have been raised at Kew from seed obtained from Mexico about eight years ago, and it is hoped to send plants to Kenya for field trials in the spring of 1947.

Sir Geoffrey Evans has assumed the Chairmanship of the Bedgebury Committee and also that of the Colonial Office Committee on Anti-Locust Research.

Bedgebury.

The National Pinetum was fortunate in sustaining no damage from enemy action during the war, although the area around suffered bomb

damage during the Battle of Britain and was in the direct line of the Flying Bomb attacks. The war, of course, made it difficult to expand the already representative collection, and shortage of staff and materials rendered maintenance difficult.

Mr. W. Dallimore, to whose care and devotion since 1925 full tribute has been paid by the members of the Pinetum Committee, asked to be relieved of his duties in October, 1945, as his health might preclude regular visits in the future. He was persuaded to continue as a member of the Committee, where his great knowledge of forest species and his experience of local conditions will continue to be of the utmost value. Mr. W. L. Taylor resigned the Chairmanship of the Committee and was succeeded by Sir Geoffrey Evans.

It has been decided that the collections now necessitate the appointment of a whole-time resident officer, who will not only be concerned with the maintenance and future development of the estate but will be in a position to see to the correct labelling of the various species, keep regular observations and notes on the requirements of each, and carry out experiments in natural regeneration, maintenance of soil fertility and similar matters. When this officer, who will be styled Superintendent, has been appointed he will also resume charge of the adjacent Forest Plots which had to be relinquished during the war years. It is proposed that this officer should be a member of the Forestry Commission service and should be seconded for duty under the Pinetum Committee. Until accommodation is available in the neighbourhood it was felt that it would be difficult to attract the right kind of man for the post, but it is hoped that this difficulty will be overcome by the construction of new houses by the Forestry Commission. For the present, as a temporary arrangement, supervision is being carried out by the Chairman of the Committee, who makes as frequent visits as possible, and Mr. Castle, who has served the Pinetum so long and faithfully, has had his status raised and continues as Foreman in charge.

Lord Courthope accepted an invitation to become a member of the Committee, and his great knowledge of all matters connected with forestry will prove of great value.

Publications.

Supplement X of the Index Kewensis (1936–1940) has been passing through the press during 1946, and publication should be effected early in 1947. The compilation of Supplement XI is proceeding.

From 1942 to 1946, while the Kew Bulletin was suspended, publication of research had perforce to be made in other journals. The following is a list of the more important books or papers by members of the staff which have been published during 1946, or which will shortly appear.

W. B. Turrill : The ecotype concept. New Phyt. 45 (1946).

A quantitative study of petal size and shape in *Saxifraga granulata*. Journ. Genetics (in press) (with E. M. Marsden-Jones).

Researches on *Silene maritima* and *S. vulgaris*, XXVI : Inland populations of *S. maritima* in the British Isles. Kew Bull. 1946.

E. M. WAKEFIELD : New and interesting British fungi. Trans. Brit. Mycol. Soc. 29 (1946) (with R. W. G. Dennis).

Edible and poisonous fungi. Bull. 23, Ministry of Agric. and Fisheries, ed. 7 (in press).

C. E. HUBBARD : *Henrardia*, a new genus of the Gramineae. Blumea, Suppl. III (1946).

H. K. A. SHAW : The genus *Allium* in the U.S.S.R. (translation from the Russian). Herbertia, 11 (1946).

Notes on *Gonystylus* (in press).

Typification of names derived from persons or places (in press).

R. W. G. DENNIS : Notes on some British fungi ascribed to *Phoma* and related genera. Trans. Brit. Mycol. Soc. 29 (1946).

B. L. BURTT : *Streptocarpus polackii* sp. nov. Bot. Mag. t. 9688 (with J. R. Sealy).

E. NELMES : Key to the *Carices* of Malaysia and Polynesia. Kew Bull. 1946.

Two critical groups of British sedges, *Carex flava* L. and *C. muricata* L. Bot. Exch. Club 1945 Report (1946).

J. R. SEALY : Botanical Magazine articles tt. 9667, 9670, 9674.

D. CHATTERJEE : A note on a new genus of *Cucurbitaceae*. Nature 158, 345 (1946).

Indian species of *Arisaema*. Nature 158, 490 (1946).

An account of Kew Gardens. Science & Culture, Calcutta (in press).

The influence of the Mediterranean flora on India, l.c. (in press).

New records of plants from India and Burma. Kew Bull. 1946, 49.

J. HUTCHINSON : A Botanist in Southern Africa. Gawthorn, London.

Common Wild Flowers. Penguin Books.

F. N. HOWES : Plants and Beekeeping. Faber, London.

Fence and Barrier Plants. Kew Bull. 1946.

R. MELVILLE : Typification and Variation in the smooth-leaved Elm. Journ. Linn. Soc. Bot. 1946.

Timber Trees and Research at Kew. Official Architect, 1946.

C. R. METCALFE : The Systematic Anatomy of the Vegetative Organs of the Angiosperms. Biological Reviews, 1946.

REVIEW.

Goethe and Morphology.*—The study of the morphology of vascular plants as a subject in its own right, with its own rules and aims, has receded in relative importance to subjects involving experiment or field research. In spite of attempts to increase interest in it by advocating new hypotheses regarding the nature or the history of organs, it may be doubted if it will again dominate either the botanical text-book or the research-worker's outlook. Nevertheless, a wide knowledge of morphology is essential to students in most, if not all, branches of biology, and it is all to the good that something of the history of morphological theory—whether orthodox or heterodox—should be known to every biologist. Dr. Arber's translation of Goethe's "Versuch die Metamorphose der Pflanzen zu erklären," 1790, together with her historical and explanatory essay, form an excellent introduction to the development of morphological theory.

The "Introduction" is, in many ways, a masterpiece of learned writing. That Goethe was a combination of philosopher, poet, and botanist is clearly emphasized in such a sentence as "he treated his theory, of which he was enamoured, as having the finality of a work of art, rather than the provisional character of a work of science," or, again, "it was synthesis to which the whole of his mental and psychical equipment inclined him personally." It is clearly recognized that Goethe's great service to morphology lay in the recognition that its basis must be essentially comparative. Dr. Arber is critical of Troll's recent work in which the *sui generis* nature of root, stem, and leaf, as advocated by Goethe, is still fully accepted. Whether or not the hypothesis of the leaf as "a partial-shoot, which shows an urge towards whole-shoot characters," with a more or less parallel explanation for the root, is a great advance in morphological theory cannot be discussed here (see A. Arber, in Biol. Rev. **16,** 81–105 : 1941). One is left with the impression, though Dr. Arber may not agree with the resultant deductions, that plant morphology is, in the future, likely to be more and more linked with taxonomy, cytogenetics, ecology, and certain branches of physiology in the narrower sense, and less and less likely to be considered a subject contrasted, on its own merits, with any other.

With regard to the new translation of Goethe's "Versuch" one can have nothing but praise. It has been most carefully done and is a great improvement on earlier translations known to the reviewer.

W. B. Turrill.

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* Goethe's Botany, by A. Arber : Chronica Botanica **10,** No. 2 (1946), 2 dollars.

NOTES ON THE GENUS GONYSTYLUS TEIJSM. ET BINNEND. (THYMELAEACEAE)

H. K. Airy Shaw

TYPE-SPECIES AND SYNONYMY

The first species of *Gonystylus* to be described as such was *G. miquelianus* Teijsm. et Binnend. in Bot. Zeit. **20**, 265 (1862). At the end of their description, however, these authors added : " Hic pertinet *Aquilaria ? macrophylla* Miq. et *A. bancana* Miq." (Miq. Fl. Ind. Bat. Suppl. 355-6 : 1860), and it is therefore clear that the epithet *miquelianus* was a superfluous one. From Teijsmann and Binnendijk's account of their species, it is evident that *Gonystylus* " *miquelianus* " was described almost entirely from Javanese material, and fortunately there are in the Kew Herbarium three good sheets of the type collection, as well as very poor ones of the types of Miquel's two species. Comparison of the three leaves no doubt that the Sumatran *A. macrophylla* and the Javanese *G. miquelianus* (s. str.) are conspecific,* whilst *A. bancana* is distinct†; and in point of fact Teijsmann and Binnendijk, while including Sumatra, the type-locality of *A. macrophylla*, in the distribution of their *G. miquelianus*, omitted from it Banka, the type-locality of *A. bancana*. The following new combination and adjusted synonymy are therefore necessary :—

Gonystylus macrophyllus (*Miq.*) *Airy Shaw*, comb. nov.

Aquilaria ? macrophylla Miq. Fl. Ind. Bat. Suppl. 356 (1860).

Gonystylus miquelianus Teijsm. et Binnend. in Bot. Zeit. **20**, 265 (1862), *nom. illegit.* (*superfl.*) ; Miq. in Ann. Mus. Bot. Lugd.-Bat. **1**, 133, t. iv (1863-4) ; Koord. et Val. Bijdr. No. 9 Kenn. Booms. Java, in Meded. 's Lands Plantent. **61**, 48 (1903).

G. bancanus auctt., quoad pl. Jav. et Sumatr., non (Miq.) Baill.†

Sumatra (Priaman, *Diepenhorst* [type of *A.? macrophylla* Miq.]) ; Java (Tjampea, prov. Bogor, *Ten Cate* [type of *G. miquelianus* T. et B.],

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* There is in Borneo a closely related species, characterized by its midrib being narrowly elevate above, not channelled, and by its much narrower and more acute sepals, which may be distinguished as follows :—

Gonystylus stenosepalus *Airy Shaw*, sp. nov., ex affinitate *G. macrophylli* (Miq.) A. S., sed ab omnibus speciebus cognitis costa supra anguste prominente nec alte argute impressa distincta ; foliis 12–20 cm. longis 5–9 cm. latis siccitate lutescentibus utrinque sub lente densissime glanduloso-punctatis, sepalis anguste triangularibus 6–7 mm. longis basi 2 mm. tantum latis, petalis circiter 20 pustulatis glabris.

Sarawak. Rejang River, near Sibu, 1891, *Haviland* 489 (d.g.b.f.): " Small tree."

† *G. bancanus* (Miq.) Baill. (s. str.) is, I believe, represented by two specimens in Herb. Kew, from Sarawak, near Kuching : 28 Feb., 1893, *Haviland & Hose* 3660A and 3660K. The species is characterized by its small leaves (4·5–13 cm. long, 2–5·5 cm. wide), drying a purplish-brown colour beneath, and (if the above *Haviland & Hose* specimens are correctly identified) by its short, almost deltoid sepals, somewhat approaching those of *Amyxa pluricornis* (Radlk.) Domke. Its occurrence in Amboina (cf. Merr. Interpr. Rumph. Herb. Amb. 353 : 1917 ; " Ceram (*Dakkus*) "—Domke, 1934, p. 35) seems improbable, though I have seen no Moluccan material of the genus at all. A specimen from S. Dutch New Guinea (van der Sande River, 100 m., 16 Sept., 1912, *Pulle* 390), distributed as *G. bancanus*, probably represents an undescribed species near *G. borneënsis* (Van Tiegh.) Gilg.

and other localities in the lowlands, where it is rare, according to Koorders & Valeton, l.c.).

SECTIONS OF THE GENUS

G. macrophyllus must be regarded as the type-species both of the genus and of the type-section, which may be diagnosed as follows :—

Gonystylus Sect. **Eugonystylus** *Airy Shaw*, sect. nov. Flores in inflorescentia thyrsoïdea irregulariter nodoso-fasciculati ; ramuli brevissimi, haud elongantes. Petala glabra, raro sparse retrorso-setulosa. Capsula sphaerica vel late ovoïdea, haud vel vix costata.—Typus : *G. macrophyllus* (Miq.) Airy Shaw (i.e. *G. miquelianus* Teijsm. et Binnend., pro maxima parte).

In Hook. Ic. Plant., *tab. ined.*, I have given the diagnosis of a second section, based upon *G. augescens* Ridl. in Kew Bull. **1946,** 43 (1946), which for convenience may be repeated here :—

Gonystylus Sect. **Auxanthus** *Airy Shaw*, sect. nov. Flores secundum ramos inflorescentiae paupere paniculiformis regulariter racemose dispositi ; rami valde elongantes. Petala intus dense retrorso-setulosa. Capsula (? an semper) anguste lanceolata, grosse sexcostata.—Typus (species adhuc unica) : *G. augescens* Ridley ex Airy Shaw.

A third section is required for the remarkable plant described by Domke in Notizbl. Bot. Gart. Berl. **12,** 233 (1934) under the name *Gonystylus sympetala* Van Steenis et Domke. I have, unfortunately, not yet seen material of this interesting species, but the very full description published by Domke leaves no room for doubt as to its isolated position in the genus. The section may be diagnosed as follows :—

Gonystylus Sect. **Aëtoxylon** *Airy Shaw*, sect. nov. Folia opposita vel sub-opposita. Flores in umbellas axillares pedunculatas aggregati. Petala ad annulum humillimum integerrimum glabrum membranaceum redacta. Capsula plus minus globosa, ecostata, vel loculorum abortu elongato-curvata.—Typus (species adhuc unica) : *G. sympetala* Van Steenis et Domke.

The name *Aëtoxylon* refers to the fact, mentioned by Domke, *l.c.*, quoting information supplied by Van Steenis, that aromatic heartwood is formed regularly by *G. sympetala*, instead of only occasionally or irregularly as in the case of most other species. The native name *kayu garu*, applied to several Thymelaeaceous trees yielding a similar heartwood, signifies 'eagle wood' ; hence *Aëtoxylon*, from the Greek ἀετός eagle, ξύλον wood.

TWO NEW SPECIES

G. confusus *Airy Shaw*, sp. nov., cum *G. maingayi* Hook. fil. hucusque confusus, sed differt foliis siccitate sordide nigro-purpurascenti-brunneis vel subplumbeis (hoc noto cum *G. calophyllo* Gilg congruit) nec laete olivaceo-castaneis, utrinque (etiam subtus) distincte lucidulis, textura tenuiore, epidermi superiore sub lente (praeter nervos prominulos) plus minus laevi (interdum sub lente verruculis minutissimis consperso) nec ut in *G. maingayi* dissite impresso-punctato et minute ruguloso (" chagrin-

ato "), costa subtus glabra vel pilis parcissimis adpressis instructa, floribus paullo maioribus extra paullo magis adpresse et sericeo-tomentellis, fructu ut videtur multo maiore usque 10 cm. diametro (in *G. maingayi* vero vix ultra 3 cm. diametro).

Arbor 15–24 m. alta, trunco usque 60 cm. diametro, ramis pendulis (omnia teste *Kunstler*). *Ramuli* modice graciles, teretes, cortice fusco striato interdum transverse fisso, lenticellis parvis inconspicuis. *Folia* oblanceolato-oblonga vel rarius oblonga, 9–27 cm. longa, 3·5–9 cm. lata, basi cuneata usque rotundata, apice abruptiuscule cuspidata usque breviter acuminata, cuspide vel acumine obtuso, integerrima, angustissime incrassato-marginata, tenuiter vel modice coriacea, siccitate sordide nigro-purpurascenti-brunnea vel subplumbea (inferne magis brunnescentia), utrinque glaberrima nisi subtus pilis paucis adpressis prope costam interdum instructa, sub lente utrinque manifeste vel obscure brunneo- vel fusco-puncticulata et interdum insuper verruculis microscopicis undique conspersa ; costa subtus elevata, supra plana vel vix prominula, basin versus impressa ; nervi laterales numerosi, gracillimi, paralleli, late patuli, prope marginem anastomosantes, in marginem anguste incrassatum demum desinentes, utrinque prominuli ; venulae minores primariis plerumque parallelae, valde reticulatae ; petioli 8–17 mm. longi, 1–3 mm. crassi, plus minus teretes, striati, rugosuli, glabri. *Inflorescentiae* terminales vel hinc inde ut videtur axillares, parce vel vix ramosae, ramis usque 13 cm. longis fasciculos florum dissitos subsessiles vel breviter nodoso-stipitatos gerentibus, subadpresse ochraceo-pubescentes. *Fasciculi* usque 3 mm. longi, pauciflori, dense ochraceo-pubescentes. *Bracteae* alabastris iam minimis caducae, ovatae, dorso carinatae, usque 4 mm. longae et 2–3 mm. latae, subacutae, densissime ochraceo-sericeae. *Pedicelli* graciliusculi, sub anthesi usque 18 mm. longi, densissime fulvo-ochraceo-tomentelli, longitudinaliter striati. *Alabastra* globosa, ante anthesin circiter 5 mm. diametro, basi subintruso-truncata. *Sepala* imbricata (2 exteriora, 2 interiora, 1 intermedium), ovato-deltoïdea, 6–7 mm. longa, 2·5–3·5 mm. lata. *Petala* circiter 30, subulato-filiformia, 3–4 mm. longa, laevia, glabra. *Stamina* circiter 30, filamentis 1 mm. longis, antheris aequilongis. *Ovarium* ovoïdeum, fere 3 mm. longum, sericeum, sulcatum, apice appendicibus vel processubus 3 parvis subglobosis pubescentibus circa styli basin instructum. *Fructus* magnus, subglobosus, 4–10 cm. diametro (teste *Kunstler*), pericarpio lignoso usque 7–8 mm. crasso extra valde ruguloso, endocarpio tenui coriaceo-crustaceo a pericarpio secedente. *Semina* (quum solitaria) subglobosa, usque 3·6 cm. diametro.

Penang. Government Hill, 360 m., Apr. 1885, *Curtis* 1509 : " Tree 60 ft. high." Ibid., July 1893, *Curtis* 3036. Ibid., Mar. 1915, *Ridley* sine num.

Perak. Goping, Apr. 1885, *Scortechini* 1937. Tapa, n.d., *Wray* 1252 : " Tree ; calyx green covered with golden brown hairs, petals white, stamens four [sic!], lemon yellow centre." Larut, open old jungle, rocky localities, 150–300 m., Jan. 1883, *King's Collector* 3778 (*typus*, Herb. Kew) : " A tree 50 to 70 ft. high. Stem 1½ to 2 ft. in diameter. **Leaves glossy,** middle green. Fruit 1½ to 2 ins. in diameter, a rusty brown." B[atang] P[adang] D[istrict], dense jungle on low hills, 90–150 m., July 1885, *King's Collector* 7752 : " A tree with hanging branches, 60 to 80 ft. high.

Stem 18 to 24 ins. in diameter. **Leaves glossy,** bright green. Fruit rusty greenish brown, 2 to 4 ins. in diameter."

Selangor. Rawang, 1914, *Kloss* sine num. Klang Gates, lowlands, 1 Jan. 1921, *Ridley* sine num. : " Tree, fruits large brown." Ayer Hitam Reserve, 5 Nov. 1925, *Omar & Ja'amat* 10908 (vernacular name *karu-karu*).

Singapore. Garden Jungle, 1907, *Ridley* sine num. (probably 6186).

Lingga Archipelago. Prope Singkip, n.d., *Teijsmann* 12075 (distributed as " Dipterocarpea—Seraja ").

This species has been hitherto confused with *Gonystylus maingayi* Hook. fil. It may therefore be useful to cite the specimens of the latter that have been verified :—

Penang. Government Hill Road, 90 m., 16 July 1918, *Md. Nur* 3784 : " 20–40 ft. high." Perak. Sine loc. vel dat., *Scortechini* sine num. Larut, open jungle, side of hills, 90–150 m., Dec. 1882, *King's Collector* 3703 : " A tree 50 to 60 ft. high. Stem 10 to 15 ins. in diam. **Leaves rough** in feeling. Fruit grey mottled with dark white [sic !]. The weather was very wet end of December, could not help some of the spec. falling to pieces." Ibid., open jungle on hills, 150–240 m., Apr. 1885, *King's Collector* 7478 : " A fine tree 60 to 80 ft. high. Stem 15 to 20 ins. in diam. Leaves rich green. Flower velvety, pale green, stamens pale cream color." Malacca. 6 May 1868, *Maingay* 2574 (Kew distrib. 1441) (type) : " Capsule 6 loc., 3 or 4 loculi abortive, seeds solitary in each loculus erect distinctly arillate." Negri Sembilan. Selaru Reserve, 22 April 1918, *For. Gd. Ludin* 1876 (vern. name *merawan penak*).

Sarawak. Sine loc., 1865–68, *Beccari* 1209 (type of *G. affinis* Radlk. and *G. beccarianus* Van Tiegh.). Brit. N. Borneo. Mt. Kinabalu, on slope, 840 m., 2 Sept. 1931, *Foster & Puasa* 97 in *B.N.B. For. Dept.* 3529 : " Tree 45 ft. high, 21 in. girth " ; vern. names *paliu* (Dusun), *nasi-nasi* (Kedayan).

The difference noted by Kunstler (and emphasized above in thick type) between the glossy leaves of *confusus* and the dull shagreened leaves of *maingayi*, in conjunction with the different colours assumed on drying (a metallic leaden or purplish-grey in *confusus*, a yellowish or greenish brown in *maingayi*), is very marked. The colour of the dried leaves of *G. confusus* is almost exactly the same as that which characterizes *G. calophyllus* Gilg. There appears also to be a difference in the size of the ripe fruit, that of *confusus* apparently reaching a considerably greater size than *maingayi ;* but this requires confirmation in the field, as it seems doubtful whether the fruits present on the herbarium specimens of the latter are really mature. There appears to be no significant difference either in the geographical or in the altitudinal distribution of the two species. As indicated in the diagnosis and in the enumeration of specimens of *maingayi*, the Bornean *G. affinis* Radlk. (*G. beccarianus* Van Tiegh.) is certainly referable to *G. maingayi*.

I have not seen the small-leaved specimens from Brisu (Malacca) and Bukit Timah (Singapore) referred to by Ridley in Journ. Roy. As. Soc.

Str. Br. **35,** 85 (1901), nor are they cited by Gamble in Journ. As. Soc. Beng. **75** (2), 267 (1912) (Mat. Fl. Mal. Penins. No. 23). Gamble seems to have almost stumbled on the clues to the second species, for he notes (l.c.) " considerable variation, to some extent in the leaves, but especially in the size of the fruit," of his " *G. maingayi* " material ; he notes also the fact that the leaves of the type (*Maingay* [K.D.] 1441) are " more reddish-brown and slightly more pubescent beneath than most of the other material."

The late C. F. Symington wrote me in April 1943 (the last communication received before his tragic death) : " There are at least 4, and probably 5, species of *Gonystylus* in the Malay Peninsula . . . I think Ridley had 4 species in his *G. Maingayi.*" I have been unable to distinguish more than 2 species in the limited Peninsular material at Kew, but I have no doubt that Symington's statement will be found to be correct when work can be resumed on the Kepong and Singapore material (if still extant), or in the field.

The small blunt processes or humps on the ovary at the base of the style should be compared with the remarkable curved appendages or ' horns ' found in a similar position in *Amyxa pluricornis* (Radlk.) Domke. The morphological nature and use of either are quite obscure. The humps of *Gonystylus* are clearly indicated in Dr. J. Hutchinson's drawing of the ovary in Ridley, Fl. Mal. Penins. **1,** 322, fig. 30 (1923). Domke, in Biblioth. Bot. **27,** Heft 111, 34 (1934) speaks of the " ' Nebengriffel ' unbekannten morphologischen Wertes " of *Amyxa*, " von denen *Gonystylus* keine Spur aufweist ": I believe this to be not quite accurate, and that the two sets of structures are probably homologous, but I am unable to throw any light on their true nature.

It may be noted here that the status of the genus *Gonystylus* as an undoubted member of the *Thymelaeaceae* has recently received confirmation (if indeed such was needed) from Dr. G. Erdtman's investigation of the pollen morphology: see his ' Pollen morphology and plant taxonomy, VII. Notes on various families ' in Svensk Bot. Tidskr. **40** (1), 81–2 (1946). I am convinced that the *Thymelaeaceae* (incl. *Gonystylus*) is an extremely isolated group, possibly related to *Proteaceae*, but having no connection with the *Malvales*, *Parietales* or *Myrtiflorae*.

G. keithii *Airy Shaw*, sp. nov., *G. borneënsi* (Van Tiegh.) Gilg forsan maxime affinis, sed foliis siccitate discoloribus (supra viridibus subtus rubido-purpureo-brunnescentibus, rarius utrinque viridibus) angustissime atro-brunneo-reflexo-marginatis, nervis paullo validioribus multo laxioribus et minus stricte parallelis remotius a margine et magis arcuatim anastomosantibus, petalis pustulatis et sparse retrorso-setulosis recedens.

Arbor 6–12 m. alta, usque circiter 3 dm. diametro. *Ramuli* graciles, 2–4 mm. crassi, teretes, cortice fusco tenuiter striato, lenticellis ut videtur nullis. *Folia* oblonga vel elliptico-oblonga vel leviter oblanceolata, 13–20 cm. longa, 4–6·5 cm. lata, basi late vel angustius cuneata, raro subrotundata, apice abruptiuscule brevi-acuminata acumine obtuso, integerrima, angustissime incrassato-marginata margine ipso siccitate saepe brunneo basi reflexo vel revoluto, chartacea vel tenuiter coriacea, siccitate plerumque discoloria (supra fere semper viridia, subtus plerumque plus minus brunnescentia rarius etiam viridia), utrinque glaberrima

nisi raro pilis paucis brevissimis adpressis in costa subtus basin versus instructa, epidermi sub lente inter venulas minutissime granulosa vel " chagrinata," puncticulis plerumque obscuris vel inconspicuis ; costa subtus elevata, supra argute canaliculato-impressa ; nervi laterales primarii 12–15-jugi, late patuli, subrecti vel marginem versus leviter procurvi, demum 3–5 mm. a margine arcuato-anastomosantes, graciles, utrinque (subtus magis) prominuli ; venulae minores plerumque primariis parallelae sed saepe magis patentes, reticulum subinconspicuum efformantes ; totum rete venularum pro rata laxum ; petioli graciliusculi, 1–1·5 cm. longi, 1·5–3 mm. crassi, subteretes, supra angustissime et obsolete canaliculati, minute puberuli vel glabrescentes. *Inflorescentiae* terminales vel hinc inde ut videtur laterales, subsimplices, racemum fasciculorum pedunculatorum plerumque sistentes, 9–12·5 cm. longae, sparse (apicem versus densius) adpresso-puberulae ; ramuli (vel fasciculorum pedunculi) usque 1·2 cm. longi, dense griseo-subsericei, floribus delapsis noduloso-cicatricosi. *Pedicelli* graciles, sub anthesi usque 2·1 cm. longi, dense ochraceo-tomentelli, striati. *Sepala* leviter inaequalia, ovata vel oblongo-ovata, circiter 8 mm. longa, 3–5 mm. lata, usque ad tertiam partem connata, acutiuscula usque subobtusa, extra et intus dense adpresse ochraceo-subsericea, intus insuper longe setoso-villosa. *Petala* 20–22, filiformi-subulata, circiter 5 mm. longa, apice saepe uncinato-recurvata, intus superne conspicue albo-pustulata quoque pustulo setam brevem retrorsam gerente. *Stamina* circiter tot quot petala, circiter 4·5 mm. longa. *Ovarium* obovoïdeum, 2 mm. longum, longe densissime flavo-setoso-villosum. *Fructus* (e valvula unica semineque unico *Castro & Melegrito* 1684 tantum mihi cognitus) saltem 6·5 cm. longus, rugosus, loculicidus, ut videtur quadrivalvis et tetrasperma, valvula 3·5 cm. lata. *Semina* quadrantem sphaerae efformantia, 4 cm. longa, 2·7 cm. lata, angulo interno recto, laevia, castanea.

British North Borneo. Banguey [Banggi] Island, July–Sept. 1923, *Castro & Melegrito* 1684. Sine loc. vel dat., *Wood* 2275. Gandayon, swamp, 20 May 1931, *Goklin* in *B.N.B. For. Dept.* 2087 : " Tree, 30 ft. high, diam. 8 ins. ; flower white ; used for medicine " ; vernacular name *mangriau* (Dusun). Sandakan, on a hill at mile 13, alt. 18 m., 25 May 1932, *Md. Puasa* in *B.N.B. For. Dept.* 1722 : " Tree, 40 ft. high, diam. 8 ins. ; fruit green " [but specimen in flower !] ; vern. name *saukau* (Kedayan). Kabili-Sepilok Forest Reserve, Sandakan, 10 Apr. 1935, *Castro* in *B.N.B. For. Dept.* 4381 : " Flower green, yellow inside." Bettotan, Sandakan, top of hill, alt. 42 m., 26 Mar. 1935, *Puasa* in *B.N.B. For. Dept.* 4547 ; " Tree, 30 ft. high, 20 ins. girth ; flower olive green " ; vern. names *saukau* (Kedayan), *malindah* (Sungei). Kabili Forest Reserve, Sandakan, top of hill, alt. 9 m., 9 June 1935, *Puasa* in *B.N.B. For. Dept.* 4854 : " Tree, 40 ft. high, 36 ins. girth ; fruit olive green " ; vern. name *saukau* (Dusun). Kedayan Forest Reserve, forest, alt. 9 m., 30 Mar. 1936, *Apostol* in *B.N.B. For. Dept.* 5912 : " Tree, 20 ft. high, 7 ins. girth ; flower white " ; vern. name *karai* (Malay).

It is possible that this is the species listed as *Gonystylus bancanus* (Miq.) Gilg by Merrill, Pl. Elm. Born., in Univ. Calif. Publ. Bot. **25,** 184 (1929) and as *G. maingayi* Hook. fil. by Keith, Prelim. List N. Born. Pl. Names, 91, 177 (1938). I have, however, not yet seen the specimen cited by Keith (*B.N.B. For. Dept.* 2612), and of those cited by Merrill only

Elmer 21768 is represented at Kew, in the form of a poor duplicate. The latter is almost certainly not *G. bancanus* (Miq.) Baill., but is possibly a form of *G. maingayi* Hook. fil.

Gonystylus keithii, named in honour of Mr. H. G. Keith, Conservator of Forests in North Borneo, to whom Kew and many other establishments are indebted for abundant and excellently collected herbarium material of North Bornean plants, is the only species of the genus so far known from the lowlands of this area, and appears to be moderately frequent.

Tentative key to the described species

Flowers large, up to 12·5 mm. long ; leaves up to 25 cm. long, strongly reticulate-veined and drying relatively bright green above ; petals about 40, glabrous ; fruit up to 6 cm. in diam. (Philippines) *reticulatus* (Elm.) Merr.

Flowers smaller, not exceeding 9 mm. in length ; leaves not usually drying bright green :

Inflorescence-branches elongating almost indefinitely, forming long cicatricose racemes with a few flowers at the apex at the time of flowering ; leaves up to 14 cm. wide ; petals 15–16, subulate, densely retrorse-setulose ; capsule (? always) very narrowly lanceolate, 6-costate (Sarawak ; ? Sumatra) . . . *augescens* Ridley.

Inflorescence-branches not elongating, bearing fascicles of flowers on short nodulose side-branches ; petals sparsely setulose or glabrous ; capsule spherical or broadly ovoid, not or scarcely ridged :

Petals represented by an entire shallow ring, 0·5 mm. high ; leaves opposite or subopposite ; flowers in axillary peduncled umbels (W. Dutch Borneo ; not seen) . . . . . *sympetala* Van Steenis et Domke.

Petals distinct ; leaves alternate ; fascicles of flowers not usually subtended by leaves :

Flowers 8–10 mm. long, sepals relatively narrow, 3 mm. wide at base ; petals about 18, smooth and glabrous ; leaves large, up to 30 cm. long, drying a dark fuscous leaden colour (Sarawak) . . . . . *calophyllus* Gilg.

Flowers smaller, under 8 mm. long :

Sepals relatively narrow, 2 mm. wide at base and 4–5 mm. long ; midrib of leaves distinctly and narrowly prominent above (cf. also *G. punctatus* A. C. Smith—Fiji) ; petals about 20, glabrous, pustulate (Sarawak) . . . . . *stenosepalus* Airy Shaw.

Sepals relatively broader, deltoid or ovate, often ± imbricate ; midrib of leaves deeply impressed above :

Leaves conspicuously and copiously pellucid-punctate, 9–15 cm. long by 3–7 cm. wide, oblong, gradually narrowed to the obtuse or subacute apex (Fiji ; not seen) . . . . . *punctatus* A. C. Smith.

Leaves not or obscurely punctate, generally more abruptly acuminate or cuspidate :

Leaves relatively large, 9–40 cm. long by 4–14 cm. wide ; petals numerous, subulate-filiform :

Leaves drying a dark fuscous or leaden colour, similar to *calophyllus;* petals 27–30, smooth and glabrous (Malay Peninsula) . . . . . *confusus* Airy Shaw.

Leaves drying yellowish or greenish or brownish, but not leaden :

Petals (20–22) pustulate and sparsely retrorse-setulose; leaves drying greenish above; venation rather lax (Brit. N. Borneo) . *keithii* Airy Shaw.

Petals glabrous, not setulose :

Petals (35–40) pustulate ; leaves large, up to 40 cm. long and 14 cm. wide, shagreened above, rather smooth below, drying yellowish-brown (Sumatra, Java) . . . . . *macrophyllus* (Miq.) Airy Shaw.

Petals (c. 30) smooth, not pustulate ; leaves up to 20 cm. long and 9 cm. wide ;

Leaves thicker, minutely pubescent beneath, at least towards the base of the midrib (Malay Penins., Sarawak, Brit. N. Borneo) . . . *maingayi* Hook. fil.

Leaves thinner, quite glabrous beneath (Sarawak) . . . . *borneënsis* (Van Tiegh.) Gilg.

Leaves relatively small, 5–13 cm. long by 2–7 cm. wide :

Petals and stamens about 20, " dentiform " (S. Dutch Borneo ; not seen) . . . . . *hackenbergii* Diels.

Petals 8–13*, ovate-acuminate :

Leaves elliptic, shagreened on both surfaces ; nerves slender but very prominent, especially below (Sumatra ; Sarawak) . . . . . *forbesii* Gilg.

Leaves more oblong, smoother ; nerves much less prominent, especially below (Banka; ?Sarawak; ? Philippines) . . . . . *bancanus* (Miq.) Baill.

Petals (number not stated) "filamentous, 3·5 mm. long, glabrous, . . . flattened and gradually tapering . . . , inwardly curved from the base; . . . stamens many "; leaves " thickly coriaceous, obscurely punctate, curing similarly dark brown on both sides " (Philippines; not seen) . . . . . *philippinensis* Elmer.

Petals and stamens unknown ; leaves " obovate . . . rather pale when dry, shining . . . ; lateral primary nerves . . . evident on both surfaces . . .; upper surface minutely puncticulate . . . the lower eglandular. The alliance . . . is with *Gonystylus philippinensis* Elm." (Philippines ; not seen) . . . . . *obovatus* Merr.

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* Possibly related to *G. forbesii* and *G. bancanus* is *G. warburgianus* Gilg ex Domke in Biblioth. Bot. **27**, Heft 111, pp. 5, 8, 33, 146, t. iv, fig. 32 (1932). The name is a *nomen subnudum*, since the only information given about the species is that the sepals are united at the base into a cupuliform structure (pp. 5, 33) and that the petals and stamens are reduced to 12–9 (p. 8, and t. iv, f. 32). The type is said (p. 8) to be *Beccari* 2635, presumably from Sarawak.

NEW SPECIES AND VARIETIES OF THE PERSIAN FLORA : I.

Dr. A. Parsa.

Choriospora persica *Boiss.* var. **stipitato-glandulosa** *Parsa*, siliquis glandulis stipitatis obsitis.

Kuhin, 1600 m., 1.5.38, *Parsa* 148.

Matthiola dentata *Parsa.*

Planta perennis 10–20 cm. alta, simplex vel basi ramosa, canescens, caule foliato in spicam paucifloram abeunte, floribus siccitate luteo-purpureis. *Caules* dense tomentosi, albi. *Folia* infima basalia minuta, 2×1·5 mm., obovato-spatulata, subintegra, obtusa ; caulina 2–2·5× 5–10 mm., obovato-spatulata vel inferiora suborbicularia, omnia tomentosa, supra subviridia, infimis exceptis abrupte cuneata, sensim petiolata, remote dentata, dente terminali paulo majore triangulari acutiusculo ; petiolus 3–5 mm. longus. *Sepala* exteriora basi bisaccata, adpressa, lineari-lanceolata, obtusiuscula, albo-hyalino-marginata, canescenti-tomentella, 1 cm. longa. *Petala* livido-flava vel purpurascentia, oblanceolata, obtusa, undulata, sensim in unguem longe (6–10 mm.) exsertum attenuata. *Stamina* calycem vel dimidia petala subaequantia. *Siliqua* tomentella, teres, 5–8 mm. longa, stigmate bicorni, cornibus divaricatis sub anthesi brevibus obtusis.

In Dalun, 400 m., 15.4.39. Steppo Lar Harirud, 700 m., 15.4.39; Parabedin, 1200 m., 1.4.40. Meshkamber, 1300 m., 14.6.41, *Parsa* 249.

In the sum of its characters this plant comes near to *Matthiola obovata. M. dentata* Parsa differs from it especially in the fruit being neither glabrous nor torulose.

Cleome arabica *L.* var. **lutea** *Parsa*, petalis luteis, siliquis angustioribus (3–5 mm. latis).

Bampour, 600 m., 6.5.39, *Parsa* 343.

Arenaria kourosii *Parsa* (§ 2 *Sclerophyllae* ; Boiss. Fl. Or. **1,** 690).

Planta pruinoso-glaucescens, caudicibus crassibus prostratis, caudiculis numerosis 1–5 cm. longis. *Caules* caespitosi, remote foliosi, tenuissimi, 8–15 cm. longi, simplices, glomerulo florum capitato-terminati. *Folia* turionum infima congesta, subulato-filiformia, triquetra, rigida, 3–5 mm. longa ; folia basalia et caulina 4–10 mm. longa, erecto-patula, angustissima, internodium subaequantia, basi connata, vaginulam albam brevem diametro caulis 2-plo longiorem efformantia ; folia summa infra capitulo sita, interdum vix 1 cm. longa, albo-hyalino-marginata, abrupte mucronulata. *Flores* 3–5, bracteis involucrati, in capitulam terminalem dispositi. *Bracteae* 3–4 mm. longae, paucae, glumaceo-hyalinae, sensim mucronulatae, ovato-lanceolatae, purpureo-maculatae, nervo purpureo percursae. *Sepala* 2–3 mm. longa et 1–1·5 mm. lata, bracteis conformia. *Petala* albida, retusa, obovato-elongata, calyce sublongiora. *Filamenta* 10, inclusa. *Ovarium* globosum, minusculum ; styli 3, filiformes, stigmatibus capitatis.

Kuh Dasht (Karaj), 2300 m., 20.5.41, *Parsa* 670.

The nearest affinity of *Arenaria kourosii* is with *A. tetrasticha* Boiss. Fl. Or. **1,** 698, but the following characters distinguish the new species from it : (1) our plant is not glabrous ; (2) each stem has one head of 3–5 flowers (and not a corymb) ; (3) the leaves are not scabrous ; (4) the sepals are not obtuse, and not glandular ; (5) the petals are obovate and nearly as long as the sepals.

Arenaria zargariana *Parsa* (§ *Eremogoneae* Fenzl ; Boiss. Fl. Or. **1,** 690).

Planta glaucescens, basi suffruticulosa ramosa, caudicibus prostratis caules numerosos edentibus. *Caules* tenues, semipedales, simplices, glabri vel sparsim hirtuli, glomerulo capitato terminati. *Folia* turionum brevissima, setacea, abrupte mucronulata, subcanaliculata, 3–5 mm. longa, plana ; caulina 10 mm. longa, adpresso-patula, angustissima, basi connata, internodio subbreviora, basi connata, vaginulam brevem diametro caulis 2-plo longiorem efformantibus ; folia summa 1–1·5 cm. longa, internodio 2–3-plo breviora. *Flores* numerosi, bracteis involucrati, in capitulam congestam terminalem magnitudine avellanae dispositi. *Bracteae* numerosae, latiusculae, ovato-oblongae, sensim attenuatae, setaceo-mucronulatae, 3–5 mm. longae, albido-hyalino-marginatae, dorso carinatae, nervo purpureo percursae. *Sepala* ovato-oblonga, acuta, magnitudine bractearum vel sublongiora, albida, subglandulosa, nervo purpureo percursa. *Petala* sparse hirtula, albida, obovato-oblonga, basi attenuata, integra vel retusa, calyce sublongiora. *Filamenta* inclusa. *Ovarium* ovoideo-globosum, glaberrimum, stylis 3.

Ali-abad (Ghom), 29.6.39, *Parsa.*

The material agrees morphologically with the type collection of *Arenaria polycnemifolia* Boiss. Fl. Or. **1,** 692, but the flowers of our specimen are numerous, the bracts are not green-keeled, and the petals are obovate-oblong instead of oblong-linear.

Hibiscus djabinianus *Parsa.*

Planta perennis, a basi ramosa, elatior, foliis petiolatis, floribus paucis sparsis roseis vel albis purpureo-maculatis, omnino foliis exceptis pilis albis longis patentibus vel retrorsis vestita. *Caudex* crassus, lignosus, longus, brunneus. *Caules* 30–40 cm. alti, teretes, a basi ramosi, pilis albis longis pubescenti-hirsuti. *Folia* longe petiolata, forma et magnitudine varia ; inferiora saepius minuta, 3–5–partita, laciniis obovato-oblongis acutiuscule lobatis, petiolis 3–5 mm. longis ; caetera 4–5-partita, laciniis obovato-oblongis subcuneatis lobatis, lobis obtusis ovatis, medio longiore oblongo ; superiora lobis angustioribus oblongo-lanceolatis ; omnia supra viridia, pilis parvis et longis simplicibus intermixtis, subtus pallida, pilis stellatis adpressis paucis obsita, marginibus plus minus longe et molliter albo-pilosis, nervis mediis longe et adpresse sparsim setosis. *Stipulae* mox emarcidae, setaceo-subulatae. *Petioli* infimi et caulini limbo sub-longiores, superiores limbo superati. *Bracteolae involucrales* numerosae, calycem subaequantes, lineari-setaceae, adpresso-patentes. *Calycis segmenta* ovato-lanceolata, acutiuscula, ut bracteolae pilis tuberculatis densissime scabrido-pubescentia. *Petala* alba, basi maculata, vel rosea prope basin violacea, obovata, nonnunquam

retusa, extra glanduloso-tuberculata, calyce sesquilongiora. *Capsulae* ellipticae, loculis oligospermis, seminibus minutis nigris tuberculatis.

Prope Chaharbahar, Tiss, 100 m., 8.5.39, *Parsa* 77.

The morphological affinity of this species is with *Hibiscus trionum* L. but the habit is different : our plant is a perennial and not an annual. The lower leaves are 3–5–palmately parted into obovate-oblong lobed segments (and not undivided as they are in *H. trionum* L.). The flowers are smaller and the calyx lobes are ovate-lanceolate. The petals are smaller (about 45 mm. long), white with a purple spot at the base or only purplish, and 1½ times as long as the calyx.

Hedysarum farinosum *Parsa* (sect. *Gamotion* § *Crinifera*).

Planta perennis. *Caules* subadscendentes, 5–15 cm. alti, adpresse albo-incani, simplices vel ramosi, teretes, substriati. *Stipulae* 2–3 mm. longae, connatae, albo-purpurascentes, triangulares, longe acuminatae, densissime adpresse pilosae. *Folia* 4–5 cm. longa, longe petiolata, 5–8–juga ; foliola elliptico-linearia vel elliptica, obtusa vel subretusa, mucronulata, supra parce pilosa, viridia, subtus dense adpresse canescentia, breviter petiolulata vel subsessilia, 3–12 mm. longa, 1–3 mm. lata ; pedunculi floriferi folia subaequantes vel iis vix longiores ; racemi ante anthesin ovati, subvillosi (non dense villosi), densi, ovati vel ovato-oblongi, 12–15 mm. longi et 8–12 mm. lati, deinde oblongo-cylindrici, usque 4–5·5 cm. longi. *Bracteae* albo-pilosae, lineari-filiformes, 1 mm. latae, tubum calycinum dimidium aequantes. *Pedicelli* 0·5–1 mm. longi, albo-pilosi. *Calyx* 5 mm. longus, tubo dense patulo-adpresse albo-hirsuto, dentibus inaequalibus subulatis longe acuminatis pilis albis densis patulo-adpressis obsitis tubo 2–3–plo longioribus corolla subbrevioribus. *Corolla* 6–7 mm. longa, roseo-striata ; vexillum (4·5×3 mm.) rectum (non falcatum), subobovatum, retusum, carina vix brevius ; carina 6·5–7 mm. longa, rectangularis, apice subrecta ; alae 3 mm. longae, subspatulatae, carina 2–3–plo calyce duplo breviores. *Legumen* (immaturum) 5·5 mm. longum, articulis 2 ovatis planis albo-hirtis setis longis purpureis obsitis.

Bodjnurd (Gifan), 1500 m., 20.5.39, *Parsa* 239.

The species here described forms a pretty plant with its white hairy stems and leaves and peduncled racemes of rose-coloured flowers. The fruit is covered with bright purple bristles. It is easily distinguished from *H. Wrightianum* Aitch. et Baker by : (1) the number and the shape of the leaflets ; (2) the colour of the flowers (not yellowish) ; (3) the length of the standard and wings (standard as long as wings in *H. Wrightianum*).

Astragalus (sect. **Alopecias**) **kourosianus** *Parsa.*

Perennis, caulibus pluribus decumbentibus ca. 20–25 cm. altis striatis apice subramosis dense sursum pilosis, pilis longis albis patentibus vestitis. *Stipulae* herbaceae, virides, lanceolatae, longe acuminatae, longe albo-pilosae, tuberculatae. *Folia* 2–5 cm. longa, 8–11–juga, rhachi longe albo-villosa ; foliola obovata vel elliptica, obtusissima vel subretusa, subsessilia, longe albo-villosa, maxima 5 mm. longa et 2·5 mm. lata. *Racemi* cylindrici, circiter 2 cm. lati et demum usque 5 cm. longi, densi

(18–22 fl.), villosissimi, in foliorum superiorum axillis siti, pedunculo 1·5–3 cm. longo pilis albis distantibus dense obsito suffulti. *Bracteae* lineari-subulatae, circiter 5 mm. longae et 0·5 mm. latae, longe albo-pilosae, calycis tubum superantes. *Calyx* tubulosus vel tubuloso-campanulatus, patens, dense albo-villosus, villis 1 mm. longis e tuberculo minimo ortis ; tubus 4 mm. longus et 2 mm. latus, 8–10–nervius ; dentes subulato-lineares, acuti, pilosi, tubo paulo longiores, uninervii. *Corolla* alba vel lutea ; vexillum 9 mm. longum, dorso fuscum, ungue subincurvo 2 mm. longo, lamina subpanduriformi 3 mm. lata apice retusa in unguem integrum constricta ; alae 9 mm. longae, obtuse auriculatae, unguibus tenuibus omnino liberis ; carina ca. 7 mm. longa, basi auriculata, unguibus ca. 4 mm. longis. *Legumen* immaturum ovoideum, dense tomentosum, stylo persistente mucronato ca. 5 mm. longo, in calyce inclusum ; stylus glaber.

Affinis *Astragalo crinito* Boiss. et *A. stojani* Nábělek. *A. crinita* Boiss. differt foliolis 20–25 jugis complicatis oblongo-linearibus acutiusculis supra glabris ; calycis campanulati dentibus tubo vix brevioribus ; vexillo integro ; legumine superne praesertim hirto. Ab *A. stojani* Nábělek *A. kourosianus* differt foliis 2–5 cm. (nec 8–18 cm.) longis ; vexillo 9 mm. (nec 23 mm.) longo, ungue non canaliculato, legumine immaturo longe et dense tomentoso (nec hirsuto), stylo glabro.

Hormud (Fars), 700 m., 15.4.39, *Parsa* 670.

Astragalus (**Myobroma**) **chrysanthus** *Boiss. et Hoh.* in Boiss. Fl. Or. **2,** 298, var. **elburzensis** *Parsa. Racemi* 3-flori, pedunculis dimidia folia aequantibus vel subsuperantibus, calycis dentibus tubo subduplo brevioribus.

Elburz, 3000 m., Aug. 1928, *Parsa.*

This plant is a variety of *A. chrysanthus*, from the typical variety of which it differs chiefly by the number of the flowers (3 and not 8–10), the length of the peduncles, which are much shorter than the leaves, and also by the calyx-teeth, which are nearly half as long as the tube (and not 5–6 times shorter than the tube).

Astragalus (**Alopecias**) **nadjafabadensis** *Parsa.*

Radix crassa, longa. *Caulis* elatus, 40–50 cm. longus, virens, pilis albis patulis densis vestitus, ramis crassis. *Stipulae* ovatae, basi connatae, sensim et longe acuminatae, 8–14 mm. longae. *Folia* longe petiolata, crassiuscula, cum rhachide petiolo duplo longiore, 10–20 cm. longa ; foliola 11–20–juga, utrinque pilis albis basifixis adpressis dense vestita, petiolulata, 13 mm. longa, 4–5 mm. lata ; foliola foliorum floralium minora, elliptica, apice rotundata subretusa, mucronulata. *Capitula* plura, ad nodos sessilia, globosa, multiflora, 10–20 flora, 5 cm. usque longa ; flores sessiles, majusculi, 17 mm. usque longi, siccitate flavido-violascentes. *Calyx* subcampanulatus, tubo luteo 5 mm. longo extra densissime albo-piloso (velutino-tomentoso), dentibus anguste linearibus 5–6 mm. longis viridibus longe albo-pilosis. *Corolla* sicca flavida, dein violescenti-ochroleuca (viva probabiliter violacea vel lilacina) ; vexillo calyce sesquilongiore unguiculato (20 mm. longo, ungue 4 mm. longo), lamina glabra ovata apicem versus sensim attenuata integra rotundata

basi sub-auriculata, alis breviter unguiculatis carina subbrevioribus ; carina elata basi breviter auriculata, apice biloba. *Ovarium* villosum.

In incultis Nadjafabad, Arak, 1890–2000 m., 10.6.40, *Parsa* 556.

In general appearance *A. nadjafabadensis* resembles *A. ponticus* Pall. (Boiss. Fl. Or. **2,** 408), but the calyx of our species has long teeth and long hairs. It is distinguished from *A. megalotropis* C. A. Mey. (Boiss. Fl. Or. **2,** p. 415) by : (1) the number of leaflets, which are hairy at both sides, retuse, mucronulate (and not acute) ; (2) its yellow-violet flowers (and not only violet) ; its oval (not suborbicular) standard.

Lotus pumilus *Parsa* (sect. *Ononidium* Boiss. Fl. Or. **2,** 174).

Herba annua, prostrata, adpresse cano-velutina, subsericea, caulibus tenuibus nanis 2–5 cm. longis. *Stipulae* lanceolato-triangulares, acutae, minutissimae. *Folia*, inferioribus simplicibus ellipticis exceptis, trifoliolata, longe petiolata, petiolis adpresse albo-pilosis 3–12 mm. longis, foliolis obovatis obtusis vel retusis subsessilibus 4 mm. longis et 2·5 mm. latis utrinque adpresse albo-pilosis supra viridibus subtus canescentibus. *Pedunculi* axillares, folio subduplo longiores, subtriflori, apice 1-bracteati. *Calyx* 3 mm. longus, albo-pilosus, corolla vix brevior, bilabiatus, labio superiore bifido inferiori tridentato, laciniis lanceolato-triangularibus acuminatis acutis, labii superioris tubo subaequilongis, labii inferioris tubo 2–3–plo longioribus ; vexillum 3 mm. longum, orbiculatum, apice purpureum, carinam subtus sensim curvatam vix superans. *Legumen* 5–7 mm. longum, 1 mm. latum, calyce 2–3–plo longius, adpresse albo-pilosum, lineare, subarcuatum, 7–9–spermum.

Bandar Abbas (Abergarm), 100 m., 23.4.39, *Parsa.*

This species is closely allied to *L. stocksii* Boiss. (Fl. Or. **2,** 174) from which it differs in: (1) the number of flowers (3 and not 1); (2) flower pedunculate (and not without peduncle) ; (3) calyx-lobes not equal; (4) standard not ovate; (5) pods curved, mucronate, much longer than calyx.

Colutea gifana *Parsa* (sect. *Eucolutea*).

Frutex (?) ramis glabris virgatis inermibus, cortice brunneo-albescente longitudinaliter striato. *Folia* remote imparipinnata, 2-juga ; foliola elliptica vel suborbicularia, mucronulata, crassiuscula, glauca, utrinque glabra, 3–7 mm. longa, 2·5–5 mm. lata. *Racemi* 4–5–flori, longe pedunculati ; pedunculo 12–15 cm. longo in axilla folii superioris orto glabro vel glabriusculo striato basi squamas duas 2 mm. longas apice subobtusas purpureas pilosas gerente. *Flores* nutantes, magni, 13–20 mm. longi. *Calyx* tubuloso-campanulatus, 4 mm. longus, adpresse albo-hirtulus, dentibus triangularibus acutiusculis uninerviis tubo vix brevioribus. *Corolla* flavo-aurea, vexillo orbiculari sursum curvato apice retuso basin versus breviter angustato glabro, carina apice fisso truncata longe unguiculata lamina cordato-auriculata, alis linearibus longe et obtuse auriculatis. *Antherae* aureae. *Ovarium* adpresse puberulum, utrinque angustatum, stylo sub stigmate circinnatim convoluto et ibidem intus albo-piloso.

Gifan, Bodjnurd, 1300 m., 21.5.39, *Parsa* 238.

The species described above is closely related to *C. persica* Boiss. Fl. Or. **2,** 196, from which it differs chiefly by : the number of leaflets, length of peduncles (much longer than the leaves) ; calyx teeth not acuminate, and not 5 times shorter than the tube ; standard truncate ; wings not longer than keel. This plant is associated with a *Hymenocrater.*

Amygdalus horrida *Spach* var. **alliariana** *Parsa,* foliis spathulatis (nec lanceolatis) acutiusculis (nec acutis) subintegris distinguitur.

Parabedin (Bandar Abbas, Sirdjan), 900 m., 24.4.39, *Parsa* 92.

Rosa iberica *Boiss.* Fl. Or. **2,** 687, forma **alba** *Parsa,* corolla alba (nec rosea) a planta typica differt.

Steppe of Polezangulé (North Persia), 2400 m., 14.6.37, *Parsa.*

Rosa gallica L. (*Boiss.* Fl. Or. **2,** 676), forma **lutea** *Parsa,* corolla magna lutea a planta typica recedit.

Hadjilar, 3.5.35, *Parsa* 167.

The types of all the above new species, varieties, and forms are in the Kew Herbarium.

The genus Fissipetalum *Merr.*—This genus, with the single species *F. borneënse* Merr., was described by Merrill in Journ. Straits Branch R.As. Soc. **1922** (85), 168–9 (1922), and referred with doubt to the *Olacaceae.* From this family it was excluded by Sleumer in Engl.–Harms, Nat. Pflanzenfam. ed. 2, **16b,** 32 (1935). Examination of authentic material shows that *Fissipetalum* is congeneric with **Erycibe** *Roxb.* (*Convolvulaceae*), and *F. borneënse* appears to be closely related to *E. glomerata* Bl. (*E. albida* Prain). Dr. S. J. van Ooststroom is at present revising *Erycibe* (cf. *Blumea* **3** (2), 267 : 1939), and I therefore refrain from making any transfer.

H. K. Airy Shaw.

TROPICAL AFRICAN PLANTS : XIX*.

Gomphrena celosioides *Mart.* [Amaranthaceae] in Nov. Act. Nat. Cur. **13,** 301 (1826) ; Suessenguth in Fedde, Rep. Sp. Nov. **35,** 309 (1934); Sandwith in Kew Bull., 1946, 4 (1946).

Belgian Congo. Katanga, on railroad track at Mokambo, July–Aug., 1919, *Burtt-Davy* 18086. Lovoi–Kamina, Mar., 1932, *Quarré* 2877.

Uganda. Kampala, in Government Plantation, *Liebenberg* 1048. Serere, Teso, on gravel paths, roads, etc., 1100 m., *Chandler* 33.

Kenya. Kavirondo, Kisumu, in dryish grassland just above lake, 1100 m., Oct., 1926, *Maitland* 1373.

Tanganyika. Moshi, 900 m., 12th Oct., 1928, *Haarer* s.n. Moshi, 800 m., Feb., 1928, *Haarer* 999. Tanga, common in grass on paths and roads, 15 m., 4th Nov., 1929, *Greenway* 1823. Dar es Salaam, common in grassland, 1928, *Marshall* 5. Mpwapwa, on old lands around buildings, 5th Jan., 1929, *Hornby* 59.

Zanzibar. Without locality, 1931, *Vaughan* 1100.

Portuguese East Africa. Beira, on sandy flats, April, 1921, *Dummer* 4668.

Nyasaland. Makwapala, 700 m., 4th Mar., 1934, *Lawrence* 151.

Southern Rhodesia. Salisbury, Makabusi Valley, 1400 m., Jan., 1917, *Eyles* 570. Salisbury, 1914, *Craster* 182. Manica District, Odzani River Valley, 1915, *Teague* 418.

Northern Rhodesia. Fort Jameson, 1000 m., 1st Jan., 1936, *Winterbottom* 21. Choma, by the railway, 13th Aug., 1929, *C. I. Sandwith* 182. Mazabuka, 1000 m., 22nd Aug., 1931, *Central Research Station* 465. Mwinilunga District, weed on lawn of Matonchi Farm, 16th Nov., 1937, *Milne-Redhead* 3271 (see Bot. Archiv. **41,** 79 : 1940).

I am grateful to my colleague, Mr. N. Y. Sandwith, for identifying this common denizen of eastern Africa with *Gomphrena celosioides*, a native of South America. When the account of the *Amaranthaceae* was written in the Flora of Tropical Africa the species was still unrepresented at Kew from the area covered by the Flora. It appears to have become established in a number of places during the second decade of this century and to have spread rapidly, for it is now a common weed in many places as is shown by the above citations. It is not, however, represented at Kew by specimens from Angola or the Anglo-Egyptian Sudan, neither has it yet been sent in from the area covered by Hutchinson and Dalziel, Flora of West Tropical Africa. Suessenguth (l.c.) cites several gatherings from Natal and the Transvaal. For many years this species has been masquerading in Africa under the name of *G. decumbens* Jacq., a species which is not represented at Kew from Tropical Africa.

E. Milne-Redhead.

Impatiens niamniamensis *Gilg* [Balsaminaceae] in Engl., Bot. Jahrb. **43,** 104 (1909).

I. bicolor Hook. f. in Journ. Linn. Soc. Lond. **6,** 7 (1862) non Royle (1839); Hook. f. in Hook., Bot. Mag. **89**, t. 5366 (1863) ; Oliv. in Oliv., Fl. Trop. Afr. **1,** 299 (1868).

* Continued from Kew Bull., 1940, 66 (1940).

I. dichroa Hook. f. ex Gilg in Engl., Bot. Jahrb. **43,** 104 (1909), non Hook. f. (1908); Hutch. et Dalz., Fl. W. Trop. Afr. **1,** 142 (1927).

Unfortunately J. D. Hooker's names for this striking species are illegitimate, both being later homonyms. *Impatiens niamniamensis* Gilg was described as a species closely allied to Hooker's plant, and differing from it in indumentum and habit, characters now shown to be unsound in the light of additional material from the Belgian Congo and Uganda. I therefore adopt *I. niamniamensis* Gilg to cover the species in the broad sense. The colour of the spur varies from deep purple to deep crimson or flame, whilst the standard and lateral petals, always paler than the spur, are often almost white. The species is frequent through the forest areas of tropical Africa from the Cameroons Mountain in the west to the Kenya side of Lake Victoria in the east, whilst a specimen of a closely allied or possibly identical species has been collected in the Uluguru Mountains in Tanganyika. A crimson-flowered form has recently been introduced into cultivation at Kew from Entebbe, Uganda.

E. Milne-Redhead.

Syzygium huillense (*Hiern*) *Engl.* [Myrtaceae] in Engl., Bot. Jahrb. **54,** 339 (1917).

Eugenia guineënsis (Willd.) Baill. ex Laness. var. *huillensis* Hiern, Cat. Afr. Pl. Welw. **1,** 359 (1898), pro parte, quoad *Welwitsch* 4401.
Syzygium mumbwaënse Greenway in Kew Bull., 1929, 196 (1928).

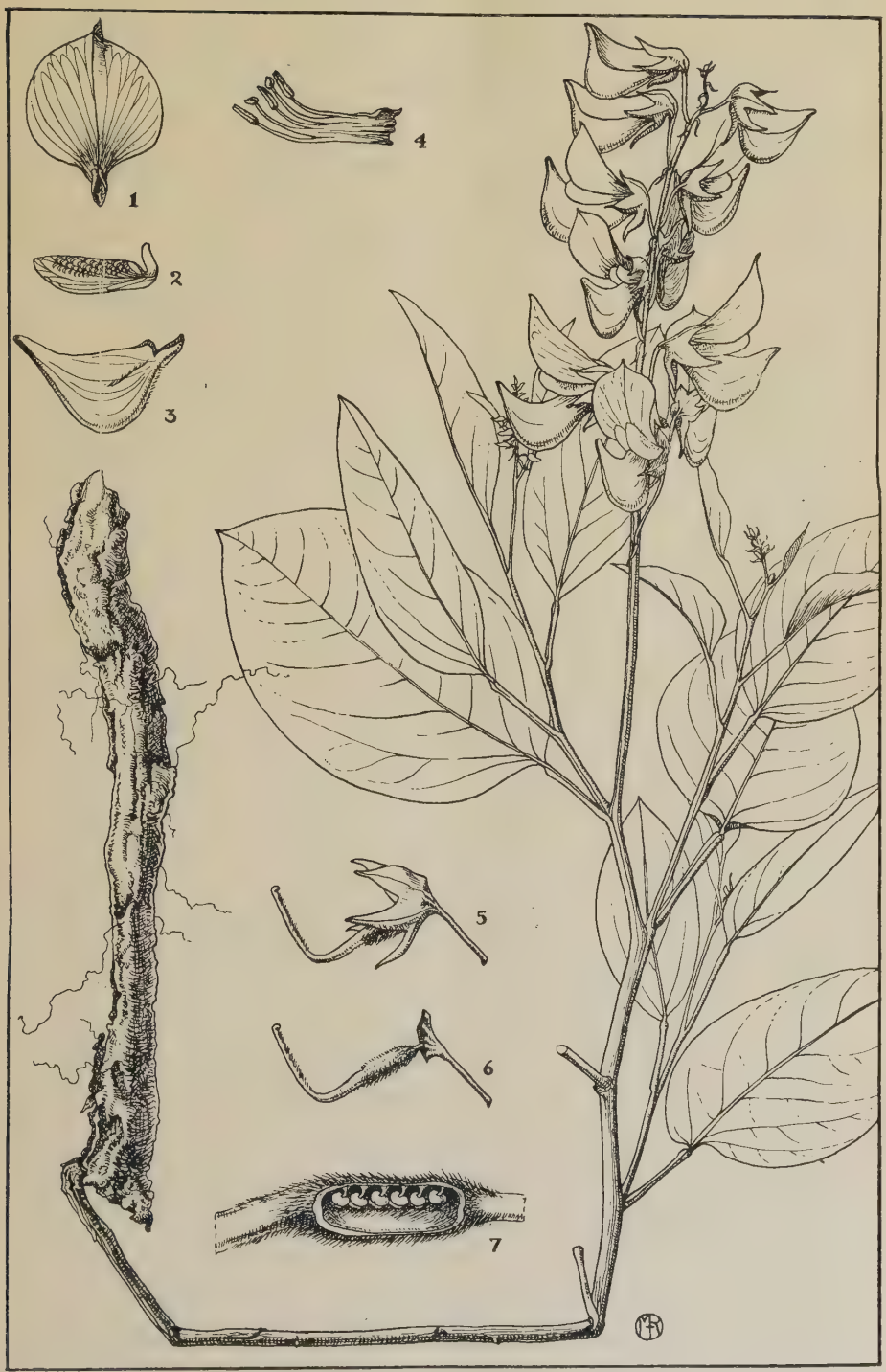
Belgian Congo. Katanga : Kansenze, 16th Aug., 1931, *de Witte* 575.

Southern Rhodesia. Between Umtali and Salisbury, Nov.–Dec., 1899, *Cecil* 47 :—dwarf bush, 3–6 dm. high ; [galled] flowers olive green. Between Salisbury and Bulawayo, Nov., 1899, *Cecil* 80 :—bushes 3–6 dm. high, forming wide patches. St. Friars Mission, Febr., 1917, *Mundy* 3195 : grows in the grass and has edible fruits.

Northern Rhodesia. R. Kankasa, on anthill, 22nd Dec., 1907, *Kässner* 2101. Namwala District. Very common in sandy dambos at Namwala, 1150 m., Sept., 1932, *Trapnell* 1106 :—behaves as a " geophyte " or subterranean shrub here, but this may be due to fire ; fruit eaten by natives ; Chitonga name *higisu ;* Chiïla name *sichisu.* Sandy dambos at Namwala, 1150 m., Nov., 1932, coll. *Gordon Reid, Trapnell* 1179 :—geophyte. Mumbwa District. Chibuluna vlei near Mumbwa, *Macaulay* 995 (type of *S. mumbwaënse* Greenway) :—undershrub. Ndola District. In vleis at Ndola, Oct., 1906, *Allen* 309 :—shrubby growth. Mwinilunga District. In dambo just W. of R. Dobeka near Matonchi Farm, on drier sandy ground at edge of boggy grassland, 1500 m., 11th Oct., 1937, *Milne-Redhead* 2701 :—dwarf shrub with woody root-stock ; leaves light green, calyx yellowish ; flowers white ; fruit eaten by natives.

Angola. Huilla District. Between Mumpulla and Nene, abundant in bushy pastures, Oct., 1859, *Welwitsch* 4401 (type) :—a dwarf shrub, 2–3 dm., very gregarious, quasi-caespitose ; stems erect or ascending ; flowers white ; fruit edible.

E. Milne-Redhead.



Crotalaria unicaulis Bullock. Whole plant (× 2/3) ; 1, standard (× 1) ; 2, wing (× 1) ; 3, keel (× 1) ; 4, half a staminal bundle (× 1) ; 5, calyx and gynoecium (× 1) ; 6, do. with calyx-lobes removed (× 1) ; 7, ovary with side removed to show ovules (× 2⅔).

Baphia pyrifolia (*Desv.*) *Baill.* [Papilionaceae] in Bull. Soc. Linn. Par. **1,** 445 (1885).

Delaria pyrifolia Desv. in Ann. Sci. Nat. ser. i, **9,** 406 (1826).
Carpolobia dubia G. Don, Gen. Syst. **1,** 370 (1831), non *Baphia dubia* De Wild.
Bracteolaria polygalacea Hook. f. in Hook., Niger Fl. 322 (1849).
Baphia polygalacea (Hook. f.) Bak. in Oliv., Fl. Trop. Afr. **2,** 248 (1871).

Botanists do not appear to have adopted Baillon's combination for this well-known West African plant.

E. Milne-Redhead.

Crotalaria unicaulis *Bullock* [Papilionaceae] in Kew Bull., 1931, 271 (1931) ; descriptio a *Milne-Redhead* emendata et ampliata.

Herba perennis ; radix cylindrica, descendens, circiter 1 cm. diametro et 25 cm. longa vel ultra. *Caules* solitarii, erecti, simplices vel furcati, teretes, plus minusve sulcati, glauci. *Folia* petiolata vel interdum sessilia, unifoliolata, exstipulata ; petioli adscendentes, 18–23 mm. longi, supra late excavati, glabri ; foliola ovata, elliptica vel late oblanceolata, 8 cm. longa, 5 cm. lata, apice acuta, vix acuminata, basi cuneata vel rotundata, matura glabra, immatura subtus adpresse pubescentia ; costa et nervi laterales, praecipue subtus, prominentes. *Inflorescentiae* racemosae, terminales, 6-13-florae, usque 10 cm. longae ; rhachis glabrescens ; bracteae subulatae vel lineari-lanceolatae, circiter 5 mm. longae, glabrescentes ; pedicelli adscendentes, circiter 1·5 cm. longi, medium versus bracteolis duabus minutis caducis instructi. *Calyx* 5-dentatus, glaber ; tubus 5 mm. longus, circiter 10 mm. latus ; dentes lanceolati, acuti, 7 mm. longi, basi 5 mm. lati. *Vexillum* late ovatum vel suborbiculare, 24 mm. longum, 17 mm. diametro, apice acutum, basi breviter unguiculatum, valde plicatum, luteum, extra nervis brunneis ornatum ; alae obovato-oblongae, circiter 16 mm. longae, apicem versus 5 mm. latae, unguiculatae, luteae ; carina paullo infra medium rotundata, apice rostrato-acuminata, basi breviter unguiculata, 23 mm. longa, 11 mm. lata, viridi-lutea, rostro luteo. *Stamina* fertilia antheris ultra 4 mm. longis praedita ; stamina abortiva fertilibus paullum longiora, antheris valde redactis. *Ovarium* stipitatum, circiter 6 mm. longum, villosum, ovulis ± 12 ; stylus circiter 20 mm. longus, infra medium curvatus, superne rectus, postice pilosus, stigmate glabro. *Legumen* ignotum.

Northern Rhodesia. Mwinilunga District. In bush [probably near Kalene Hill], c. 1400 m., Nov. [1928 ?], *Marks* 10 (type) :—shoots single, not in clumps, 2–3 dm. ; flowers bright yellow, darker at back of petals.

Angola. Moxico District. Just N. of R. Ysenga by path through native gardens, 15th Jan., 1938, *Milne-Redhead* 4133 :—perennial with vertical rootstock ; stems erect, glaucous, dull purple or grey-green ; leaflets rather blue-green, slightly glaucous below ; calyx green tinged dull purple ; standard outside yellow speckled brownish, inside yellow ; wings yellow ; keel yellow-green with yellowish beak.

The above additional gathering of this distinct species, from Angola, shows it to be a perennial. Only the two upper leaves of the type

specimen are typical, as the additional material shows that there is normally a definite petiole separated from the lamina by an articulation. The lower leaves of Miss Marks' plant have the lamina narrowing gradually into the petiole, a condition which must be considered abnormal. I am indebted to my wife for the illustration of *C. unicaulis*, which is based on the Angola gathering.

E. Milne-Redhead.

Vigna paludosa *Milne-Redhead*, sp. nov. [Papilionaceae] ; a *Vigna racemosa* (G. Don) Hutch. et Dalz. inflorescentia breviore, bracteolis longioribus, vexillo bilobato, carina in rostrum spiraliter recurvata, petalis flavis, legumine recto valde hirsuto, seminibus subquadratis hilo longo instructis valde distincta.

Herba, forsan perennis, volubilis. *Caules* foliosi, pilis longis retrorsis dense vel parce induti. *Stipulae* lanceolatae, acutae, basi in calcar lanceolatum 2–3 mm. longum productae, in toto usque 12 mm. longae, longe hirsutae. *Folia* trifoliolata ; petioli usque 4·5 cm. longi, retrorsim longe hirsuti ; foliola lanceolata vel ovato-lanceolata, haud lobata, lateralia paulum obliqua, usque 7 cm. longa et 2 cm. lata, utrinque praesertim ad nervos parcissime longe hirsuta ; petioluli circiter 2 mm. longi, densiusculi hirsuti ; rhachis circiter 5 mm. longa, ut petioli hirsuta ; stipellae oblongae, 1·5 mm. longae, glabrae. *Pedunculi* axillares, 6–13 cm. longi, usque 6-flori, apicem versus densius adpresse retrorsim hirsuti. *Flores* brevissime racemosi, racemis circiter 10 mm. longis, per paria dispositi ; pedicelli 1·0–1·5 mm. longi, glabri, bibracteolati ; bracteae lineari-lanceolatae, 7 mm. longae, longe hirsutae ; glandula conspicua intra quoque pari pedicellorum sita ; bracteolae lineari-lanceolatae, usque 7 mm. longae, longe hirsutae. *Calyx* late campanulatus, 4 mm. longus, hirsutus ; dentes late triangulares, tubo breviores. *Vexillum* glabrum, bilobatum, unguiculatum, circiter 12 mm. longum et 12 mm. latum. *Alae* oblique obtriangulatae, basi anguste unguiculatae, ungue usque 3 mm. longo, supra unguem breviter acute calcaratae, in toto circiter 12 mm. longae et 7 mm. latae. *Carina* valde elongata, superne in rostrum spiro-recurvata, apice truncata, basi unguiculata, circiter 10 mm. longa (statu curvato), basin versus 4 mm. lata, apice 1·5 mm. lata. *Stamina* circiter 19 mm. longa, cum carina contorta ; antherae 0·6 mm. longae. *Ovarium* sessile, lineare, 6 mm. longum, dense adpresse hirsutum ; stylus circiter 17 mm. longus, inferne filiformis, glaber, superne leviter incrassatus compressusque, curvatus, postice apicem versus longitudinaliter barbatus ; stigma obliquum. *Legumen* lineare, rectum, circiter 3·5 cm. longum, 6 mm. latum, breviter rostratum, pilis longis brunneis indutum ; semina circiter 6, subquadrata, crassa, leviter compressa, circiter 3 mm. diametro, saturate brunnea, hilo 3 mm. longo instructa.

Sierra Leone. Port Loko District. Port Loko, 1st Dec., 1914, *N. W. Thomas* 5845. Port Loko, 15th Dec., 1914, *N. W. Thomas* 6520, 6523, 6634. Mange Bureh, in moist place, 11th Jan., 1928, *Deighton* 1043 :—herbaceous climber, flowers yellow, fruits covered with bristles. Bombali District. Makump [near Magburaka], near stream, 9th Dec., 1928, *R. R. Glanville* 119 :—creeper with yellow flowers. Kambia

District. Rokupr [Kupr], common among grass in swamps, 29th Jan., 1935, *Deighton* 2953 (type) :—flowers yellow. Rokupr, in marsh, 22nd Jan., 1945, *Deighton* 4050 :—flowers yellow.

At first sight, at least in the dried state, this plant suggests *Vigna racemosa* (G. Don) Hutch. et Dalz., for in habit, leaf-shape and indumentum of the stems there is great similarity between these two species. However, the much shorter inflorescence, the bracteoles nearly twice the length of the calyx, the broader, almost bristly, straight legume, and the subquadrate seed with long hilum are sufficient characters easily to separate *V. paludosa* from *V. racemosa*. Examination of the flowers provides characters even more striking. The deeply bilobed standard and the elongate recurved keel petals enclosing the very long stamens and style, recalling those of *Vigna macrorrhyncha* (Harms) Milne-Redhead (a widely spread glabrous species as yet unrecorded from farther west than Nigeria), are markedly different from those of *V. racemosa*, whilst the yellow colour of the flowers of *V. paludosa* serves readily to separate the species in the living state.

Whilst *V. racemosa* appears to grow in dryish habitats, *V. paludosa* has a liking for wet places, in riverside grasslands and swamps. The species appears to be very local in its distribution, and has not yet been recorded outside Sierra Leone.

Landolphia calabarica (*Stapf*) *E. A. Bruce*, comb. nov. [Apocynaceae].

Carpodinus calabaricus Stapf in Kew Bull., 1894, 19 (1894).

Landolphia ? bracteata Dewèvre, Caoutch. Afr. Monogr. Landolph. 31 (1895).

Caralluma speciosa (*N.E. Br.*) *N.E. Br.* [Asclepiadaceae] in Gard. Chron. Ser. 3, **12,** 370 (1892) et in Dyer, Fl. Trop. Afr. **4** (1), 479 (1903) ; Berger, Stapelieen und Kleinien, 77 & fig. 17, 1–2 (1910) ; White et Sloane, The Stapelieae, ed. 2, **1,** 243 & fig. 184 (1937), et in Cactus and Succulent Journ. America **12,** 82 & fig. 2 (1940).

Sarcocodon speciosus N.E. Br. in Journ. Linn. Soc. Lond. **17,** 170, fig. 12, 4–8 (1878).

Caralluma codonoides K. Schum. in Engl. Pflanzenw. Ost-Afr. **C,** 328 (1895) ; N.E. Br. in Dyer, Fl. Trop. Afr. **4** (1), 480 (1903) ; Berger, Stapelieen und Kleinien, 77 (1910); White et Sloane, The Stapelieae, ed. 2, **1,** 245 and figs. 182, 183, 185 et **3,** 1178 (1937).

C. oxyodonta Chiov., Fl. Somala, **2,** 298 & fig. 174 (1932); White et Sloane, The Stapelieae, ed. 2, **1,** 233 & fig. 172 (1937).

British Somaliland. Hargeisa, on top of limestone escarpment, 1600 m., 25th Sept., 1932 (fl.), *Gillett* 4056 :—flowers dark red, foetid smell ; vernac., *udab tis* (stink, useless). Wagga Mt., 2000 m., Feb. (fl.), *Lort Phillips* s.n. :—large flower-head size of man's fist.

Italian Somaliland. Near Brava, Mogadoxo, Nov., 1875 (stems recd. March, 1876, flowers in spirit, Sept., 1876), *Kirk* s.n. (type). Oltregiuba District ; Chisimaio, near Afmadu (fl.), *P. Gorini* 37 (type of *C. oxyodonta*) :—flowers maroon with yellow cup in centre.

Tanganyika Territory. Mkomazi valley, Kalamba-Mnazi, common in open places in *Acacia-Euphorbia* desert country, 500 m., 13th Jan.,

1930 (fl. & fr.), *Greenway* 2052 :—a much branched, succulent herb, 3 dm. high, with greenish-brown stems and very dense clusters of reddish-brown to almost black, evil-smelling flowers with red-haired fringed perianth segments. W. Usambara. Mkomazi, in dense clumps in reddish soil in *Acacia* desert grass formation, about 500 m., 22nd April, 1934 (flr.), *Greenway* 3938 :—perennial succulent herb up to 6 dm. tall with clusters of dark reddish-brown evil-smelling flowers. Mkomazi-Kihurio, common, but scattered, in *Acacia-Sansevieria* desert grass formation, about 650 m., 9th Sept., 1935 (fl.), *Greenway* 4067 :—a much branched, procumbent, succulent, perennial herb, up to 6 dm. tall, with dark brownish-crimson, dense, globular heads of evil-smelling flowers blotched with dirty yellow at centre ; stems 4-angled, brownish-green with grey-brown line at angles. Journey to Kilimanjaro, between Gonja and Kihurio, frequent in very dry succulent-steppe, beginning of July, 1894 (fr.), *Volkens* 2382 (*type of *C. codonoides* K. Schum.) :—angled, spiny, leafless, like a succulent *Euphorbia*, 25 cm. high with a cluster of almost black, foetid flowers, which in size and shape resemble *Campanula Trachelium*. Succulent-steppe between the northern slopes of Usambara Mts. and Kihurio, 9th Oct., 1902 (fl.), *Engler* 1522a. East foot of Pare, in succulent-steppe near Kihurio, about 700 m., 16th Dec., 1901 (fl.), *Uhlig* 811 :—flowers brown-black-violet. Mombo, 10th Oct., 1911 (fl.), *Braun* 3711. Mkumbara-Kihurio steppe, 17th Aug., 1908 (fl.), *Koestlin* 1951 :—flowers dark brown-red, smell of old cheese.

The type of *C. speciosa* (N.E. Br.) N.E. Br. is represented by four pieces of stem received from Dr. Kirk in March, 1876, and twelve flowers received in spirit (since dried) the following September. As the flowers were originally placed in spirit they have lost colour and some indumentum but have more or less retained their size. These factors have to be taken into consideration when comparison is made with other material. The main distinctions between *C. speciosa* and *C. oxyodonta* are in the size of the inflorescence and the structure of the corona. According to observations made in the field by the late Mr. B. D. Burtt the former character varies considerably within a species and is not of specific importance.

The latter character, the corona structure, has been carefully examined and in this respect *C. oxyodonta* agrees exactly with *C. speciosa* (the corona having the five deeply bifid outer lobes and the small subquadrate inner ones). The figures of the corona depicted in Fl. Somala, **2,** 299, fig. 174 (2–4), and reproduced in White and Sloane, *l.c.* fig. 172, which show five entire acute outer corona lobes, are incorrect. The specimen (*Dr. P. Gorini* 37) agrees in other respects with the type of *C. speciosa* and there is little doubt that these two species are synonymous.

There has already been some question as to the validity of *C. codonoides* as a distinct species. The original description was very incomplete and comparison from it was impossible ; this has since been amplified by Miss Obermeyer (White and Sloane, ed. 2, **3,** 1178), so that a good description is now available. The flowers from the *type* of *C. speciosa*

* The type specimen of *C. codonoides* (Volkens 2382) consists of two pairs of follicles and a small " capsule " containing seeds ; there are no flowers or stems, though these are described on the collector's label.

present a rather different appearance because of their original preservation in spirit, and their colour cannot be determined, but according to field collectors the colour of other specimens collected in Somaliland agrees very well with those from Tanganyika.* The papillose inner surface of the corolla described by Miss Obermeyer seems to be a variable character, and may depend to some extent on the method of preservation of the specimens. This character is visible in some flowers from Somaliland and Tanganyika, whereas in others it cannot be distinguished. The flower size, corona structure and stem characters of these specimens agree very well and there are no real grounds for retaining *C. codonoides* as a distinct species.

E. A. Bruce.

Ixora rhodesiaca *Brem.* sp. nov. [Rubiaceae] ; maxime ut *I. radiata* Hiern, sed statura, foliis, floribus minoribus, inflorescentia minus congesta, corolla extra puberula, tubo intus glabro ab ea recedens.

Frutex sempervirens, 1·80 m. altus, ramis foliisque glabris. *Rami* novelli complanati, sicc. striati, mox tamen teretes, 3–4 mm. diam. *Folia* plerumque sessilia, interdum tamen petiolo usque ad 1·5 mm. longo munita ; lamina anguste elliptica vel oblonga, 11–15 cm. longa et 4·4–6·4 cm. lata, foliorum superiorum interdum ovata, 8–14·5 cm. longa et 4·5–7 cm. lata, apice acuta et mucronata, basi obtusa, rotundata vel subcordata, coriacea, supra nitidula, sicc. haud conspicue decolorata, nervis utroque latere costae 9–11 subtus prominentibus et supra sicut reticulatione prominulis. *Stipulae* 5 mm. longae, basi in vaginam 1·2 mm. altam connatae, lamina carinata infra late et supra anguste triangulari et conduplicata intus ad basin villosa. *Inflorescentia* pedunculata, trichotome corymbosa, valde contracta tamen, puberula, floribus circ. 27. *Pedunculus* 1–2·5 cm. longus, internodio brevi foliis rudimentariis vel parvis interdum tamen usque ad 2 cm. longis munito praecessus. *Internodia* infima trichotomiae 3·5 mm. longa ; alia paulo breviora. *Pedicelli* florum lateralium triadis usque ad 2 mm. longi ; flos centralis subsessilis. *Bracteae* ovatae vel triangulares, infimae 3 mm. longae ; aliae breviores. *Bracteolae* florum lateralium basi ovarii insertae, triangulares, 0·7 mm. longae ; flos centralis ebracteolatus. *Ovarium* ovoideum, 1·3 mm. altum, puberulum. *Calyx* puberulus, tubo 0·6 mm. alto ; lobis triangularibus 1·4 mm. longis interdum inaequalibus. *Corollae* tubus extra minute puberulus, intus glaber, 4 cm. longus et 1 mm. diam. ; lobi elliptico-oblongi, 8 mm. longi et 3·2 mm. lati, intus sparse puberulo-pubescentes, obtusi, margine recurvati. *Stamina* filamentis 1·5 mm. longis ; antheris 6 mm. longis. *Stylus* glaber, stigmatibus 2 mm. longis comprehensis 4·5 cm. longus.

Northern Rhodesia. Mwinilunga District. In evergreen vegetation by River Matonchi, below the dam, 21st Oct., 1937, *Milne-Redhead*

* Since the original writing of this note, Mr. P. R. O. Bally, a keen collector of Stapelieae, has informed me that this species also occurs in Abyssinia and in Kenya in the following localities :—Sagalla, Ndara, Magadi and Maktao. This additional information is of value in linking up the distribution of *C. speciosa*, which is now shown to occur from Somaliland and Abyssinia southward through Kenya to Tanganyika Territory.

2888 (type in Herb. Kew) :—flowers fading, white tinged pink ; fruits green turning to orange red and blackish purple.

C. E. B. Bremekamp.

Morinda morindoides (*Bak.*) *Milne-Redhead*, comb. nov. [Rubiaceae].

[*Morinda longiflora* (non G. Don.)—Hiern in Oliv., Fl. Trop. Afr. **3,** 192 (1877), pro parte].

Gaertnera morindoides Bak. in Kew Bull., 1892, 83 (1892).

Morinda confusa Hutch. in Kew Bull., 1916, 11 (1916).

Under Art. 60 of the International Rules the epithet *confusa* must be rejected as illegitimate, since at the time of its publication an earlier validly published epithet was available. The rejection by Hutchinson (l.c. 9) of the epithet *morindoides* on the grounds of its incongruity in combination with the generic name *Morinda* is not permitted under Art. 59 of the International Rules.

Pavetta coriacea *Brem.* [Rubiaceae] in Fedde, Rep. Sp. Nov. **37,** 69 (1935).

The type-specimen and another specimen, both collected by G. F. Scott Elliot on the Ruwenzori Expedition of 1893-94, are erroneously cited by Bremekamp (l.c.) as coming from Mt. Ruwenzori. Both these specimens were collected on Stevenson Road, either in Northern Rhodesia or Nyasaland.

E. Milne-Redhead.

Pentas zanzibarica (*Klotzsch*) *Vatke* [Rubiaceae] in Oesterr. Bot. Zeitschr. **25,** 232 (1875).

Pentanisia zanzibarica Klotzsch in Peters, Reise Mossamb. Bot. 286 (1861).

Pentas purpurea Oliv. in Trans. Linn. Soc. London, **29,** 83 (1873) ; Hiern in Oliv., Fl. Trop. Afr. **3,** 46 (1877).

It appears that Klotzsch's epithet, which is twelve years earlier than Oliver's, should be adopted for this well-known species.

E. Milne-Redhead.

Sarcocephalus latifolius (*Smith*) *E. A. Bruce*, comb. nov. [Rubiaceae].

Nauclea sambucina T. Winterb., Acc. Sierra Leone, **2,** 45 (1803), nomen nudum.

N. latifolia Smith in Rees, Cycl. **24,** no. 5 (1819).

Sarcocephalus esculentus Afzel. ex Sab. in Trans. Hort. Soc. Lond. **5,** 442 (1824).

Cephalina esculenta (Afzel. ex Sab.) Schumach. et Thonn., Beskr. Pl. Guin. 105 (1827).

[*C. scandens* (non Thonn.)—DC. Prodr. **4,** 368 (1830), pro synon.]

Tarenna rhodesiaca *Brem.*, sp. nov. [Rubiaceae] ; speciebus angolensibus *T. Gossweileri* S. Moore et *T. catocensi* R. Good affinis, sed foliis basi acutis, floribus majoribus a *T. Gossweileri*, foliis numero nervorum majore instructis subtus pubescentibus, floribus congestis, calycis lobis pubescentibus a *T. catocensi* distinguenda.

Frutex sempervirens, 4·5 m. altus. *Rami* novelli complanati, dense scabrido-pubescentes, deinde obtuse quadrangulares et mox cortice brunneo opaco vestiti, indumentum tamen diu retinentes. *Foliorum* petiolus dense pubescens, 7–14 mm. longus ; lamina elliptica, plerumque 9–13·5 cm. longa et 4·3–6·5 cm. lata, acuminata, basi acuta, subcoriacea, supra nitida, sicc. saturate olivaceo-brunnea vel subnigra, supra costa scabrido-pubescente excepta glabra, subtus primum tomentosa, deinde costa nervisque dense et inter nervos sparse pubescens, domatiifera, domatiis tamen sub pilis difficile distinguendis, nervis utroque latere costae 5–9 supra subimpressis subtus prominentibus, venulis laxe reticulatis subtus prominulis. *Stipulae* 7–8 mm. longae, basi brevissime connatae, lamina ovato-triangulari extra subglabra in aristam pubescentem ea paulo breviorem exeunte intus margine scarioso excepto sericeo-villosa. *Inflorescentia* breviter pedunculata, dense pubescens, floribus 9–15 congestis ; pedunculus 7 mm. longus ; internodia basalia ramulorum infimorum 5 mm. longa ; internodium basale axis brevius ; bracteae infimae ut folia stipulis normaliter connectae, 3 mm. longae ; bracteae aliae estipulatae, 2·5–3 mm. longae ; bracteolae ab ovario paulum remotae, 1·5–2 mm. longae ; bracteae bracteolaeque margine ad basin glanduliferae. *Ovarium* ovoideum, 2·5 mm. altum, dense adpresse pubescens ; ovulis utroque loculo circ. 10. *Calyx* dense adpresse pubescens, intus glaber, tubo 1·2 mm. alto, lobis triangularibus subcarinatis 2·3 mm. longis. *Corollae* tubus viridulus, 3·9 cm. longus et 1·8 mm. diam., extra glaber, intus dimidio superiore arachnoideus ; lobi eburnei, oblongi, 10 mm. longi et 2·8 mm. lati, basi minute auriculati, apice mucronulati. *Staminorum* filamenta glabra, 1·6 mm. longa ; antherae sicc. torsae, 8·5 mm. longae. *Discus* glaber. *Stylus* parte inclusa pilosus, basin versus tamen glabrescens, 5·6 cm. longus.

Northern Rhodesia. Mwinilunga District. Evergreen vegetation by River Lunga at Mwinilunga, 22nd Nov., 1937, *Milne-Redhead* 3335 (type in Herb. Kew) :—evergreen shrub, 4·5 m. ; leaves glossy green above, paler and pubescent below ; calyx-tube whitish, lobes green ; corolla-tube greenish-cream ; lobes 5, cream-coloured.

C. E. B. Bremekamp.

Echinops (§**Phaeochaete**) **reticulatus** *E. A. Bruce*, sp. nov. [Compositae—Cynaroideae] ; ab *E. Mildbraedii* Mattf. foliis basi auriculato-cordatis subtus glandulosis nec arachnoideo-lanatis, nervis reticulatis valde distincta.

Herba 0·7–1 m. alta, erecta, superne ramosa, ramis patenti-adscendentibus 20–30 cm. longis. *Caules* herbacei, sulcati, dense glanduloso-hispidi, sparse arachnoideo-lanati, internodiis parte inferiore 1·5 cm. superiore circiter 0·5 cm. longis, capitulis terminati. *Folia* alterna, sessilia, erecto-patentia ; lamina integerrima, sagittato-lanceolata, basi auriculato-cordata, amplexicaulis, apice acuta, 3–10 cm. longa, basi 0·7–2·7 cm. lata, apice sensim angustata, supra setis pungentibus dense obsitis, subtus glandulosa, nervis prominentibus valde reticulatis glanduloso-hispidis, nervo medio basin versus leviter arachnoideo, margine setis paullo validioribus obsita. *Capitulum generale* circiter 3 cm. diametro, globosum, solitarium, brevissime pedunculatum. *Capitula*

partialia (propria) numerosa ; involucrum circiter 1·5 cm. longum ; involucri setae stramineae, 3–4 mm. longi ; bracteae circiter 20 ; exteriores spathulatae, margine superne setoso-pungentes, circiter 5 mm. longae, apicem versus circiter 1 mm. latae, spinescentes ; intermediae anguste lanceolatae, longe acutae, spinescentes, margine laxe setosae, circiter 13 mm. longae, infra medium circiter 2·5 mm. latae ; intimae basi connatae, anguste oblongae, margine apicem versus denticulatae, apice acutae, spinescentes, circiter 1·3 mm. longae, 2 mm. latae. *Corolla* glabra, caerulea, 15 mm. longa, usque ad medium incisa, lobis circiter 1 mm. latis. *Antherae* circiter 7 mm. longae, caudis 1 mm. longis. *Achaenia* (immatura) villosa.

Uganda. West Nile Province. Kobopo, January, 1938, *C. Hazel* 420 (type) : —in open grassland ; height 6–9 dm., flowers dark blue.

Inula decipiens *E. A. Bruce*, nom. nov. [Compositae].

Inulaster macrophyllus Sch. Bip. ex A. Rich., Tent. Fl. Abyss. **1,** 399 (1847).
Inula macrophylla (Sch. Bip. ex A. Rich.) Sch. Bip. ex Schweinf. et Aschers. in Schweinf., Beitr. Fl. Aethiop. 285, 307 (1867), non Kar. et Kir. (1841).

Aloë zanzibarica *Milne-Redhead*, nom. nov. [Liliaceae].

Aloë concinna Bak. in Dyer, Fl. Trop. Afr. **7,** 461 (1898), non *A. concinna* (Haw.) Roem. et Schultes (1829).

A new name is necessary for this distinct little *Aloë*, since Baker's name is illegitimate, the epithet having been used earlier for the plant now known as *Haworthia viscosa* (L.) Haw. var. *concinna* (Haw.) Bak.

Anthericum dimorphum *von Poellnitz* [Liliaceae] in Bol. Soc. Brot. sér. 2, **16,** 43 (1942).

[*A. triflorum* (non Ait.)—Bak. in Dyer, Fl. Trop. Afr. **7,** 493 (1898), quoad spmn. ex Mt. Malosa.]

Nyasaland. Chamba River south of [Mt.] Namitawa, 1200 m., Sept., 1902, *McClounie* 101 (type in Herb. Berol. destroyed, neotype in Herb. Kew). Same locality and date, *McClounie* 100. Mt. Malosa, 1200–1800 m., Nov.–Dec., 1896, *Whyte* s.n., pro parte.

Portuguese East Africa. Near Lake Nyasa, 1902, *W. P. Johnson* 536.

A. dimorphum was described from a duplicate of *McClounie* 101 at Berlin, presumably now destroyed, which had been distributed from Kew without data and which was cited as coming from "Britisch Zentralafrika : Ubi ?, 1903." It was collected near the Chamba River south of Mt. Namitawa in September, 1902. Mt. Namitawa is situated on the present Northern Rhodesia/Nyasaland frontier, the actual boundary being the watershed. As the Chamba River is a tributary of the R. Lufira flowing east into Lake Nyasa, it is safe to assume that the type locality of *A. dimorphum* is in Nyasaland.

E. Milne-Redhead.

Crinum (§**Stenaster**) **minimum** *Milne-Redhead*, sp. nov. [Amaryllidaceae], affine *C. parvo* Bak. sed foliis angustissimis, perianthii tubo lobis longiore, scapo foliis breviore facile distinguenda.

Bulbus ovoideus, circiter 7 cm. diametro, collo circiter 3 cm. longo instructus. *Folia* circiter 7, erecta, spiraliter disposita, anguste linearia, usque 17 cm. longa et usque 2·5 mm. lata (plerumque angustiora), haud striata vel conspicue nervata, usque ad apicem bulbi sub finem cujusque temporis incrementi marcescentia, basibus eorundem foliorum proximo tempore ita recrescentibus ut folia nova efficiant, probabiliter per compluria tempore incrementi persistentibus ; margines laeves. *Scapus* lateralis, 4–10 cm. longus, circiter 5 mm. diametro, semper uniflorus. *Spathae valvae* 2, persistentes, lineares, inferne expansae 4·5–6 cm. longae, apice acutae, papyraceae. *Pedicellus* 0·5 mm. longus, teres. *Flos* zygomorphus. *Perianthii tubus* subcylindricus, apice leviter ampliatus, 8·5–12 cm. longus, circiter 5 mm. diametro, leviter arcuatus ; *lobi* subaequales, anguste lanceolati, 6·5–9 cm. longi, exteriores 10–11 mm. interiores 13–14 mm. lati, apice acuti, patentes. *Stamina* fauci perianthii tubi affixa : filamenta filiformia, circiter 8 cm. longa, declinata, subaequalia ; antherae lineari-oblongae, usque 17 mm. longae, leviter curvatae. *Ovarium* ellipsoideum, haud lobatum, circiter 13 mm. longum et 7 mm. diametro ; ovula circiter 6 pro loculo. *Stylus* filiformis, bene exsertus, cum staminibus declinatus. *Stigma* integrum vel minute trilobatum, papillosum. *Capsula* non visa.

Northern Rhodesia. Mwinilunga District. Cha Mwana (Chibara's) Plain, plentiful locally in sandy ground towards edge of plain with *Parinari capensis* Harv. and a rhizomatous *Entada* sp., 14th Oct., 1937, *Milne-Redhead* 2761 :—bulb about 7 cm. in diameter ; leaves spirally arranged, not wrapped round each other at base because too narrow, linear, crescent-shaped in section, all but youngest with imperfect apices ; perianth tube greenish, segments white with broad pink median line outside, white inside, very acute; flower zygomorphic; stamens declinate ; style and filaments white below, mauve above.

Crinum minimum is by far the most delicate and graceful species known. It exhibits great morphological reduction, not only in general size but in the number of flowers per umbel and in the width of leaves. The fruit unfortunately is unknown.

It appears to be a very local plant, being apparently absent from several similar sandy plains in the neighbourhood of Matonchi Farm. Had not Capt. K. R. Paterson, with whom I was staying, told me that he had seen a small *Crinum* growing on Chibara's Plain and directed me to the locality, I would never have collected it. Even there it was plentiful only over a small part of this large sandy plain although similar vegetation extended hundreds of yards farther on.

Juncus dregeanus *Kunth* [Juncaceae], Enum. 344 (1841) ; Buchenau in Engl. et Prantl Pflanzenr. **4** (**36**), 251 (1906).

Uganda. Bugishu, Bulambuli, 2700 m., 4th Sept., 1932, *A. S. Thomas* 573 :—locally common beside stream ; tufted, 3 dm. high ; tepals black. Butandiga, 2100 m., April, 1930, *Liebenberg* 1715. Mt. Elgon, local by stream in bamboo zone, 3300 m., Jan., 1918, *Dummer* 3463. Ruwenzori, without definite locality, 3000 m., April, 1932, *Oliver* 27.

I am indebted to Dr. H. Weimarck of Lund for the recognition of the above-cited specimens as the South African rush, *Juncus dregeanus*.

Not only is this a new record for Tropical Africa but it is a very considerable northern extension of the range of the species. Although it is now known to occur on both Mt. Ruwenzori and Mt. Elgon, it has not yet been gathered outside Uganda. It is to be hoped that it may be found not only on the Kenya side of Mt. Elgon, but also on some of the other East African mountains.

E. Milne-Redhead.

TYPIFICATION OF NEW NAMES DERIVED FROM PERSONS OR PLACES.

H. K. Airy Shaw.

In Sprague & Milne-Redhead's note on the type of *Ormocarpum kirkii* (*K.B.* 1934, 42) and in Nelmes's paper on *Carex oederi* Retz. (*Journ. Bot.* **77,** 301 : 1939), there is a conflict of two opposing principles of typification which it seems important to recognize. In each of these two papers the authors reach the conclusion that the type of the name is the specimen upon which the accompanying description was mainly or entirely based. This indeed seems, at first sight, logical enough. But the result is that the types of the names *O. kirkii* and *C. oederi* are specimens with which Kirk and Oeder respectively had no connection. This result is at variance with the principle embodied in Recommendation XV (f) of the International Rules : " Not to name a species after a person who has neither discovered, nor described, nor figured, nor in any way studied it."* " Botanists should avoid using a collector's name as a specific epithet unless the type-specimen was gathered by that collector " (Sprague & Milne-Redhead, *l.c.* 43). Compare also *Aristida capensis* var. *dieterleniana* Schweickerdt in *K.B.* 1939, 653 (1940), based upon *Dieterlen* 1205 and *Celliers* 11; the latter specimen is expressly designated as the type, in contravention of the principle mentioned.

As stated, it is implied, in both the papers cited above, that the type of a new name must be the specimen or figure forming the basis of the accompanying description. But these two cases seem to indicate that in certain circumstances this need not necessarily be so. " Oeder's Sedge " was based upon at least two distinct elements: (A) the figure in Oeder, *Fl. Dan.* tab. 371; (B) a specimen (of *C. pilulifera* L.) in Herb. Retz. The name was derived from the first element ; the description was drawn up from the second. Is there not some reason for typifying

* A recent surprising example of the breach of this principle is Merrill and Perry's naming of three new Bornean species of *Syzygium* as *S. houttuynii*, *S. christmannii* and *S. panzeri*, in *Mem. Amer. Acad. Arts & Sci.* **18** (*Mem. Gray Herb.* **4**) (1939). Houttuyn, Christmann and Panzer had, of course, no connection whatever with the three species described.

" Oeder's Sedge " by Oeder's plant? Suppose that the specimen in Herb. Retz. had actually represented an undescribed species, instead of the well-known *C. pilulifera* L. It would then have been logical, not to call the new species *C. oederi*, but to give it a new name, such as "*retzii*," reserving the epithet *oederi* for Oeder's plant.

This treatment falls into line with the procedure enjoined by the International Rules when a new combination is found to have been based upon a misidentification, as in the case of *Tsuga mertensiana* (Bong.) Carrière (Art. 54, last example). Personal or geographical names used as the basis of names of new taxonomic groups may, in fact, be regarded as analogous to name-bringing synonyms in new combinations : they should " indicate the type." The typification of *Carex oederi* by Retzius's specimen of *C. pilulifera* would be analogous to the typification of *Tsuga mertensiana* by Carrière's accompanying description of *T. heterophylla* (Raf.) Sarg.

The writer makes these observations in no dogmatic spirit, since there is clearly room for two opinions in the instances cited. The case for typifying a species by the element indicated by its specific epithet does not, however, appear hitherto to have been sufficiently stressed. Where it is a question of two collections,—the collector, in the one case, providing the new epithet, and the specimen, in the other, (mainly) providing the accompanying description, as in *Ormocarpum kirkii* and in *Aristida capensis* var. *dieterleniana*—it may be best to follow the course advocated by Sprague & Milne-Redhead. But where, as with *Carex oederi*, the new epithet is derived from a personal name referring to an earlier publication, and a new description is provided based on material misidentified with it, there seem to be strong grounds for typifying the new name by the reference which that name indicates, if only to avoid needless multiplication of misnomers.

Analogous to the cases discussed above is that of a new epithet derived from a place-name, or the situation arising when such a name is based upon a misidentification. For example, *Poa amboinica* L. *Mant. Alt.* 557 (1771) was based upon *Phoenix amboinica montana* Rumph. *Herb. Amboin.* **6,** 19, t.vii, fig. 3 (1750), and also upon specimens collected in S. India by Koenig from which Linnaeus drew up his description. Fischer has shown (*K.B.* 1934, 398–400) that these specimens are referable to *Eragrostis riparia* (Willd.) Nees, an Indian species not occurring in Amboina. Though Merrill is not correct in stating (*Interpr. Rumph. Herb. Amboin.* 88 : 1917) that *P. amboinica* L. " is based wholly on Rumphius's description and figure," I agree with him and with Fischer that, since Linnaeus adopted, from Rumphius, the geographical epithet *amboinica*, the species should be typified by the Rumphian reference.

The points here brought forward may be summarised in the following " considerations for typification ":—

I. " Where the name of a species based on material from two or more collectors embodies the name of one of them, the species shall be typified by that collector's cited specimen (or one of that collector's cited specimens) unless it can be clearly shown that the accompanying description was mainly based upon other material." (Substituted for Point 1 of Sprague & Milne-Redhead's note, K.B. 1934, 43.)

II. "When a new taxonomic group, *bearing a name derived from that of a person or place*, is based upon two (or more) elements, one of which (A) is a reference to a previously published description or figure *in which the name of the authority (or artist) or of the locality cited, forms the source of the new name*, and another (B) is a new description based upon living or herbarium material,—either of which elements would validate the new name under the provisions of Art. 37,—the new name should, other things being equal, be typified by the element (A) *indicated by the name* in question (and not by the material forming the basis of the accompanying description), in accordance with the type method prescribed by Art. 54. In the event of the two elements being considered taxonomically distinct, the name will be retained for element (A), element (B) being re-named if not otherwise identifiable."

A. P. D. JONES.—It is with the deepest regret that we record the death, on 8th October, 1946, of Alan Philip Dalby Jones at the age of 28. Jones took Honours in Botany at Cambridge University in 1940, and subsequently a degree in forestry at Oxford. He was appointed to the Colonial Forest Service as an Assistant Conservator of Forests under the Nigerian Government, and was forthwith given charge of the botanical side of the work of the Forest Department

Philip Jones was a man of engaging cheerfulness, abounding energy, and with an inspiring enthusiasm for the science which he loved so much. Apart from his very large contributions to herbarium material and his researches into taxonomy, he brought an unusual brilliance to bear upon the complicated ecology of the West African forests, and in his few years in Nigeria gained a deeper insight into it than any other man. But despite his absorption in botany as a pure science, he was aware that his work must nevertheless ultimately serve the practical ends of everyday forestry, and in this respect alone his loss will be hard to replace. Even in his short career he made beginnings and left ideas behind him that cannot but be of the utmost value to those who follow. His published work is slight, for he was sensitive of the fact that it would be misleading to give to the world findings which he knew required yet deeper research; but it is possible, however, that some of his nearly completed reports can be rendered suitable for publication. The Forest Herbarium at Ibadan is a lasting memorial to his energy and skill.

His loss will be greatly felt in the Kew Herbarium, where his readiness to assist with the provision of material specially needed in the elucidation of some taxonomic problem or other, and his willingness to place his wide knowledge of the Nigerian flora at our disposal, made Jones a very valued correspondent. He will be mourned not only by his colleagues of the Nigerian Forest Department but by all the numerous botanical workers with whom he came in contact.

REVIEW.

Researches of Dr. E. D. Merrill.—The editors of Chronica Botanica have issued a volume* as homage to Dr. E. D. Merrill on the occasion of his seventieth birthday on 15 October 1946. The volume consists mainly of reprints of 23 selections from Dr. Merrill's published works, and is prefaced by an outline biography of important happenings in his varied and very full life and by a bibliography of his published works, whose titles and references make a list of 13½ pages.

Dr. Merrill's name will always be associated with the botanical exploration of Malaysia and especially of the Philippines on which he commenced publication in 1902. The Philippine Journal of Science was established in 1906 largely at the suggestion of Dr. Merrill, who was one of the co-editors. The herbarium of the Bureau of Science, Manila, was initiated in 1902, the first specimens being those collected by Dr. Merrill in that year. Twenty years later it contained 275,000 mounted specimens. The total loss of the building and its contents in 1945, during the re-occupation of Manila near the end of the Japanese war, must have been felt by Dr. Merrill as a great personal loss, and the sympathy of his fellow botanists throughout the world can do little more than indicate the magnitude of the tragedy. In one respect only is the loss to science less than might be estimated by those unacquainted with Dr. Merrill's methods, and, one should add, generosity. Thanks to the collecting of large numbers of duplicates and their presentation to many of the great taxonomic institutions in other parts of the world, future research workers on the Philippine flora will be able to settle problems involving typification and the many other aspects of systematic research with much less trouble and uncertainty than might be expected. Moreover, Merrill's care, lucidity, and reasonableness in drawing up descriptions make type specimens of less general importance than where descriptions are incomplete, ambiguous, or inaccurate.

Naturally, in the selection of reprinted papers attention has been given more to articles of general interest than to those purely taxonomic in a very specialized sense. Perhaps it is a pity that at least one paper with descriptions of new species was not reprinted. However, those selected indicate Merrill's wide interest more particularly in taxonomy *sensu latissimo*, in phytogeography, and in economic botany. Mention may be made of the papers on the flora of Borneo, the phytogeographic separation of Formosa and the Philippines, the correlation of the indicated biologic alliances of the Philippines with the geologic history of Malaysia, domestic plants in relation to the diffusion of culture, and some economic aspects of taxonomy. One is impressed throughout Merrill's work by his eminent balance, his refusal to accept the latest hypothesis as the key to all problems, and his undogmatic apprisal of opposed viewpoints knowing that all essential facts are not yet in evidence for the establishment of final theories.

W. B. Turrill.

* Merrilleana, a selection from the general writings of Elmer Drew Merrill, Sc.D., LL.D. Chronica Botanica **10,** no. 3/4 (1946). 4 dollars.

THE BOTANICAL NAME OF THE WILD TETRAPLOID WATERCRESS.

H. K. Airy Shaw.

Howard & Manton, in their paper " Autopolyploid and Allopolyploid Watercress, with the description of a new species " (*Ann. Bot.*, n. ser., **10,** 1 : 1946), have concluded that the allopolyploid plant represents an undescribed form, to which they have given the name *Nasturtium uniseriatum*, sp. nov. The only earlier names which they explicitly take into consideration (*l.c.* 11) are *N. siifolium* Reichb., *N. microphyllum* Boenningh. ex Reichb., and " *N. parvifolium* of Petermann " (i.e. *N. officinale* var. *parvifolium* Peterm., *Fl. Lips. excurs.* 482 : 1838) ; but they say that these " all appear to be diploid and are thus not prior names for the tetraploid."

Certainly *N. siifolium* can be ruled out : Reichenbach's excellent plates (*Ic. Bot. Pl. Crit.* **9,** t. 840, fig. 1132 : 1831 ; *Ic. Fl. Germ. Helv.* **2,** t. 50, fig. 4361 : 1837–8) leave us in no doubt as to its identity. But the grounds for assuming *N. microphyllum* and *N. officinale* var. *parvifolium* to be diploids are not clear. Howard & Manton do not state whether they have examined type material of either of these forms. Manton, in her earlier paper on " The cytological history of Watercress " (*Zeitschr. f. indukt. Abstamm. u. Vererbungsl.* **64** (1), 133 : 1935), says that " ' var. *microphyllum* ' is referred to by Hooker (1870) as merely a starved terrestrial state," and that this description is " almost certainly correct." Apart from the fact that var. *microphyllum* is not mentioned in the first (1870) edition of Hooker's *Student's Flora* (p. 22)—it was added in the third edition, 1884 (p. 25)—Hooker's statement is surely inadequate as it stands, since he failed to distinguish the diploid and tetraploid forms. From the footnote on p. 138 of Manton's 1935 paper we learn that she had specimens of a " starvation ' var. *microphyllum* ' type " in cultivation (from a wild source) which had the *tetraploid* number of chromosomes (64) ! This statement is in conflict with Howard & Manton's statement, quoted above, that all these forms " appear to be diploid." It is evident that both the diploid and the tetraploid can produce starved terrestrial states on occasion.

Nasturtium microphyllum Boenningh. ex Reichb.

Reichenbach's figure of *N. microphyllum* Boenningh. (*Ic. Fl. Germ. Helv.* **2,** t. 50, fig. 4360 : 1837–8) unfortunately shows a plant in young fruit only. Its general appearance, however—especially its large flowers and slender pedicels and siliquae—is very much that of *N. uniseriatum*, and I believe that it represents that species. Although only an examination of authentic material can positively decide this point, Mr. Howard now agrees with me that the probability of the specific identity of *N. uniseriatum* and *N. microphyllum* is so great that its assumption is justified in the absence of conclusive evidence to the contrary. *N. microphyllum* could otherwise only be the triploid hybrid, and Mr. Howard does not believe it to be this.

Reichenbach's original description of *N. microphyllum* (*Fl. Germ. excurs.* 683 : 1832) is short and inconclusive ; it may be translated : " erect, leaves pinnate, lateral leaflets free at the base, subpetiolulate, oval, acute, terminal one rounded, angled. Reichb. *Pl. Crit.* XI. ic. . . . [unpublished]. Slender habit of *Cardamine amara*, leaflets smaller, flowers intermediate between that and *Nasturtium officinale* ; axils without rootlets, short fruit of *Nasturtium*. *N. turfosum* Kz., of Chile, its nearest relative, differs in its elongate siliqua.—In marshy ground, in ditches in meadows, e.g. in Westphalia at Coesfeld, Rothenfelde (*von Boenninghausen*) ; neighbourhood of Leipzig, at Abtnaundorf (*Reichenbach*). June—autumn. Perennial." The references to " short fruit," and to the " elongate siliqua " of *N. turfosum*, might at first suggest that *N. microphyllum* was a form of the diploid, but, as already indicated, the figure could well represent a young fruiting stage of the allopolyploid. It has been so interpreted by several French botanists : cf. Boreau, *Fl. Centre France*, ed. 3, **2,** 37 (1857), where the " siliques plus effilées " are explicitly mentioned, and Rouy & Foucaud, *Fl. France*, **1,** 204–5 (1893)—" siliques grêles " ; the latter authors also, probably correctly, treat var. *parvifolium* Peterm. as distinct. Syme, *Engl. Bot.*, ed. 3, **1,** 177 (1863), draws attention to the long petals and fruit-pedicels (up to 15.5 mm. [7.3 lines] long) shown in Reichenbach's figure of *N. microphyllum*. Both these characters tend to weight the balance strongly in favour of identification with the tetraploid. No material of *N. turfosum** has been available for comparison.

Var. parvifolium Petermann

Of *N. officinale* var. *parvifolium* Petermann, *l.c.*, little need be said : it was described as " terrestrial, erect, dwarf, 2–6 inches high ; leaves often consisting of only 3 leaflets ; leaflets smaller, shortly petiolulate." It is probable that this was the form intended by Hooker by "var. *microphyllum*"—a starved terrestrial state, which can doubtless be assumed, in suitable conditions, by either the diploid or the tetraploid. The two names are equated, as *N. officinale* var. *microphyllum* (Boenningh.) Beck,† by Thellung in Hegi, *Ill. Fl. Mittel-Eur.* **4** (1), 320 (1918). Petermann's type should be examined. It may possibly turn out to represent the same form as var. *praecox*‡ S. F. Gray and/or var. *paucijugatum* S. F. Gray, *Nat. Arr. Brit. Pl.* **2,** 678 (1821), or as *Sisymbrium nasturtium* var. *minor* Van Hall, *Fl. Belg. Sept.* (*Fl. Noord-Nederl.*) **1,** 488 (1825).

Dictyosperma olgae Regel

A further name remains to be considered which may provide the valid name for the allopolyploid watercress in the event of *N. microphyllum* being shown not to apply to it. In 1882, in a paper giving descriptions of new plants collected by the botanist Olga Fedchenko in Turkestan and Kokan, Central Asia, Ernst Regel described a new genus and species of Cruciferae,

* Kunze ex Walpers in *Nov. Act. Phys.-Med. Acad. Nat. Cur.* **19,** Suppl. i. 247 (1843).

† An incorrect citation, since Beck, *Fl. Nieder-Österr.* **2** (1), 464 (1892), published it as *Roripa nasturtium* var. *microphylla*. Cf. chronological list of names, *infra* (p. 43).

‡ Var. *precocius* DC. *Regn. Veg. Syst. Nat.* **2,** 189 (1821).

*Dictyosperma olgae.** It was described as a flaccid herb with the habit of *Cardamine*, the stems angled and rooting at the base, the leaves pinnatisect, the siliquae somewhat terete, elevate-nerved, the seeds uniseriate, immarginate, scarcely compressed, and, under a lens, covered with a cellular reticulation with exceedingly minute spinules arising therefrom. Curiously enough it was not compared with *Nasturtium officinale*, but only with *Barbarea*, *Cardamine* and *Arabis*, " from which the subterete elevate-nerved siliquae and the seed-structure easily distinguish it." The generic name was shortly afterwards found to be a later homonym of *Dictyosperma* Wendl. et Drude, 1875 (Palmae), and was therefore altered by Durand & Jackson, *Ind. Gen. Phanerog.* 494 (1888), to *Pirea* Dur. et Jacks.

Attention was first drawn to the relation of this plant to *Nasturtium* by Lipsky, Materials for a flora of Central Asia, in *Acta Horti Petrop.* **18,** 7 (1900) (see also his introduction, p. II). " Examination of specimens, both authentic and collected later," he writes, shows that it is " none other than the common *Nasturtium officinale* R. Br.—the form with elongate siliquae, which occurs also in Europe. . . . Siliquae identical with those of *Dictyosperma* (*Pirea*) *Olgae* can be seen in herbaria from various countries—Germany, France, Greece, Caucasus, Abyssinia." Actual specimens from these countries were cited on the next page (p. 8). Bush, in Kuznetsov, Bush and Fomin, *Fl. Cauc. Crit.* **3** (4), 79, 323–4 (1909) (see also his introduction, pp. XXIII, XXXIII, XXXVI, LV), treated it as var. *olgae* Busch (siliquae longer and slenderer than type, 16–27 mm. long,† 1–1.75 mm. broad, much curved), adding : " Its distribution is actually extremely wide. It has even been introduced into North America !" This is confirmed by specimens in the Kew Herbarium. Hayek, however, in his " Entwurf eines Cruciferen-Systems auf phylogenetischer Grundlage " (*Beih. Bot. Centralbl.* **27,** ii.: 1911), considered that it was scarcely separable even as a form from *N. officinale*. Most subsequent authors, e.g. Vasilchenko in Komarov, *Fl. URSS.* **8**, 143 (1939), have likewise attached little importance to the plant. Specimens in the Kew Herbarium, authenticated by Lipsky, put its identity beyond doubt.

Gandoger's micro-species

At least two of the micro-species into which *N. microphyllum* Reichb. was divided by Gandoger, *Fl. Eur.* **2,** 287 (1884), appear to represent the tetraploid, viz. *N. longirameum* Gand., from Waterford (*Britten*), " siliqua 20–21 mm. longa, 1.5 mm. lata," and *N. stylosum* Gand., from Liverpool (*Harbord*), " siliqua 18–20 mm. longa."

Conclusion

For the present, until it is known whether Boenninghausen's type specimen of *N. microphyllum* is extant, and, if extant, whether it can be definitely assigned either to the diploid or to the tetraploid, it is suggested that the wild tetraploid watercress may be referred to as **Nasturtium microphyllum** *Boenningh. ex Reichenb., sensu Boreau* (1857). In view of

* E. Regel in *Izv. Imp. Obshch. Lyub. Yestestv., Antropol. i Etnogr.* (*Bull. Imp. Soc. Amat. Nat. Hist., Anthropol. & Ethnogr.*), **34** (2), 5 (1882).

† Almost exactly the range given by Irmisch and Glück (see Appendix, *infra*, p. 43), *ll.cc.*

the rather long tradition (1857–1893) in France of this interpretation of *N. microphyllum*, it might even be expedient to adopt this designation for the tetraploid in the event of the type being found to have been lost or destroyed, or being not definitely assignable. The writer, however, considers that there is such a strong presumption of Reichenbach's figure (with its combination of large flowers, long pedicels and slender young pods) representing the tetraploid, that few qualms about accepting Boreau's interpretation need be entertained.

Distribution

In addition to the countries cited by Lipsky (*l.c.*), specimens from the following (besides Great Britain) are represented in Herb. Kew. and Herb. Mus. Brit. :—

Sweden. In rivulo pr. Visby Gott. rarius, Jul. 1868, *F. Ahlberg.*

Spain. " In rivulis totius Castellae, Aprili ad Septemb. ", *Herbarium Graelsianum.* Prov. Teruel, Moscardon, prairies tourbeuses, sur le calcaire, 1600 m., rare, Juin 1894, *E. Reverchon* 944 (as *N. officinale* " forma *microphylla* Reichb. ", det. O. Debeaux).

Austria. Styria, Cilli, 12 June 1842, *Alexander Prior.*

Afghanistan. Sir-i-Chushma, 27 Aug. 1839, *Griffith* 1463. Kurrum Valley, wet land, meadow near Péwárkotal, profuse, 26 July 1879, *Aitchison* 894.

Eritrea. Aïdéresó, 1245 m., 6 avril 1892, *Schweinfurth & Riva* 1455.

Kenya. Stream-edge, Limuru, 2100 m., Feb. 1915, *Dümmer* 1517.

Uganda. Toro, 1500 m., 1905, *Dawe* 661. In running water, Fort Portal, Toro, 1500 m., 12 April 1906, *Bagshawe* 969.

South Africa. C. B. S., *Herb. Cayley* (*ex Herb. Benth.*, 1854) ; C. B. S., *ex Herb. Harvey* 566 (*ex Herb. Hook.*, 1867). Cape of Good Hope, 1771, *Banks & Solander.* Somerset East : in rivulis ad ped. Montis Boschberg, Nov. 1871, *Herb. MacOwanianum Austro-Africanum* 1233.

Canada. Lake Region and Ontario, 16 Aug. 1877, *Macoun* 137. In creeks, London, Ontario, 7 June 1884, *Burgess* 114.

Newfoundland. Eastern Avalon Peninsula, sandy and gravelly banks of Waterford River between Waterford Bridge and St. John's, in water, Aug. 1911, *Fernald & Wiegand* 5482.

U.S.A.—Massachusetts : Valley of the Hoosic River, meadows and swales near the river, North Adams, 25 June 1913, *Fernald & Long* 9553. California : Jonesville, Butte County, in very cold spring creek in shade ; less frequent in the sun ; in appearance, native ; 1500 m., 15 July 1929, *Copeland* 368 (doubtful specimen) ; *sine loc. exact., Dr. Coulter* (ex Herb. Coll. SS. Trin. Dublin) (doubtful).

Synonymy

It may be useful to conclude with a chronological list of the principal names here considered.

Nasturtium microphyllum Boenninghausen ex Reichenbach, *Flora Germanica excursoria*, 683 (1832), et *Icones Florae Germanicae et Helveticae*, **2**, t. 50, fig. 4360 (1837-8).

??N. OFFICINALE var. PARVIFOLIUM Petermann, *Flora Lipsiensis excursoria*, 482 (1838).

N. FONTANUM (Lam.) Aschers. var. LONGISILIQUA Th. Irmisch in Mohl u. Schlechtendal, *Botanische Zeitung*, **19,** 317 (1861).

DICTYOSPERMA OLGAE Regel in *Izvestiya Imperatorskago Obshchestva Lyubitelei Yestestvovaniya, Antropologii i Etnografii*, **34** (2), 5 (1882). (Sep. title: Fedchenko, *Puteshestvie v Turkestan*, vyp. 18, tom III, Botanicheskiya Izsledovaniya).

PIREA OLGAE (Regel) Th. Durand ex Prantl in Engler u. Prantl, *Natürl. Pflanzenfam.* III, **2,** 183 (1891).

(?) RORIPA NASTURTIUM (Moench) Beck var. MICROPHYLLA (Boenningh. ex Reichb.) Beck, *Flora von Nieder-Österreich*, **2** (1), 464 (1892).

N. OFFICINALE var. OLGAE (Regel) Bush in Kuznetsov, Bush et Fomin, *Flora Caucasica critica*, **3** (4), 323 (1909).

?? N. PARVIFOLIUM (Peterm.) "Petermann" ex Howard et Manton in *Annals of Botany*, new series, **10,** 11 (1946), *in obs.*

N. UNISERIATUM Howard et Manton, *l.c.* 11–12 (1946).

APPENDIX: IRMISCH'S PAPER ON THE WATERCRESSES (1861).

An extremely important paper which has been apparently overlooked in this enquiry*, though not affecting the nomenclature on the specific level, is that by Thilo Irmisch, "Ueber zwei Varietäten der Brunnenkresse", in Mohl & Schlechtendal's *Bot. Zeit.* **19,** 316–19 (1861). It is considered worth while to give the translation which follows. Irmisch distinguished the two forms as *N. fontanum* (Lam.) Aschers., vars. *brevisiliqua* and *longisiliqua*, respectively, and it will be seen that there were few aspects of their economy, except the cytological, which he did not investigate.

ON TWO VARIETIES OF THE WATERCRESS

by TH. IRMISCH

"It is well known that several varieties of the watercress (*Nasturtium fontanum* [Lmk.] Aschers., *N. offic.* R. Br.), based on the size and shape of the leaves, have been distinguished, which are indeed sometimes accorded the rank of species, but apparently little attention has been paid to the variations exhibited by the fruit. Already a great many years ago I found, not far from Sondershausen, in marshy places in one of the few meadows left to us, two variations strikingly aberrant in fruit characters and immediately distinguishable by them. I have [p. 317] recently investigated them afresh and consider them not unworthy of description.

"In the one variation, which I call var. *longisiliqua*, the ripe siliqua when ready for dehiscence measures, together with its pedicel, 1 in. to 1 in. 7 lines.[1] Of this length generally ⅓ belongs to the pedicel and ⅔ to the siliqua. Thus I found, in the great majority of examples, that the ripe siliqua measured 1 in. and its pedicel ½ in.; in other cases the length of the siliqua amounted to 1 in. ½ line, that of the pedicel 6½ lines; sometimes, however, the pedicel is relatively shorter: siliquae measuring 9 or 10½ lines had pedicels of only 3 lines.

"In the other form, which I call var. *brevisiliqua*, the length of the ripe siliqua and its pedicel together, from numerous measurements, comes to 7½–9 lines: of this 3–4½ lines belongs to the pedicel and 4½–6 to the siliqua. The proportion of the latter to the former is not constant, since one finds, for example, with a length of 4½ lines for the siliqua a length of 4½ or even 3 for the pedicel, and with a siliqua length of 6 lines a pedicel length of 3; sometimes also the pedicel is somewhat longer than the siliqua.

* I find, however, that it is cited by Arber in *New Phytol.* **30,** 189, 203 (1931).

[1] [N.B.—1 inch = c. 25 mm.; 1 line = c. 2 mm.].

" Associated with the difference in the length of the siliquae is a similar difference in their breadth in these varieties, so that var. *longisiliqua* has narrower siliquae than var. *brevisiliqua* : in the latter the greatest breadth of the ripe siliquae is 1½ line, in the former ⅔–1 line. These differences are slight in themselves, but in association with the difference in the length of the siliquae they enhance the different appearance of the latter in the two varieties. In thickness I found no marked distinction, and precisely on this account the pods of var. *brevisiliqua* appear more flat and those of var. *longisiliqua* more cylindrical. The persistent style of the former is, relatively to the breadth of the whole siliqua, slightly broader than that of var. *longisiliqua*. The number of seeds in each valve in var. *brevisiliqua* is 12–20, in var. *longisiliqua* 20–25 ; in the former, however, frequently a number of seeds abort and the valves consequently present an uneven [bumpy] appearance. The size of the ripe seeds I found to be the same in both, likewise their colour : when they fall out of the ripe fruit they are yellow ; when older they become somewhat browner. On the other hand I could always recognise that the fine network of ridge-like projections on the testa had coarser meshes in var. *brevisiliqua* than in var. *longisiliqua*. Whereas I counted 6–7 meshes in a row on one face of the seeds of the former, in the latter I counted mostly twice as many.

" The flowers in var. *longisiliqua* are somewhat larger, and the anthers somewhat longer, than in the other, if one compares them from flowers of as near as possible equal development. The anthers in both are yellowish and the filaments later turn violet.—Certainly the raceme in var. *longisiliqua*, at the time when the lower fruits begin to ripen and there are only a few flowers at the tip of the inflorescence still bearing sepals and petals, is mostly a span long or even more, whereas in var. *brevisiliqua* it is scarcely as long as the middle finger or only slightly longer, but there is considerable variation in this.

" In other respects I found no difference between the two : they have the same caespitose growth, the same leaf forms, both are glabrous (though there are short hairs on the upperside both of the petioles and pedicels, especially noticeable in var. *brevisil.*) ; they both flower from spring until late in the autumn.* Both grow in one meadow, mostly in separate clumps, more rarely intermingled. I have repeatedly been able to satisfy myself that the shoot which had arisen from the axil of the uppermost leaf below a fruiting raceme and later, after it had borne a larger number of leaves, once more terminated in a flowering raceme, retained the fruit-form of the preceding generation.

" I have no doubt that, in view of the complete agreement of the two varieties in their vegetative organs, transitions will occur in regard to the distinctions here emphasized ; but I have not yet observed any such with us, which is perhaps due merely to the restricted distribution which the plant has with us.

" On the germination and rooting of the watercress reference should be made to my remarks in this magazine for the year 1857, no. 27.† " [Vide *Bot. Zeit.* **15,** 449–453, footnotes (1857).] " The two varieties agree in these respects.

" Which [p. 318] of the two varieties is the more common elsewhere, or whether they both occur (as here) equally commonly, I am unable to state. I incline to think, however, that var. *brevisiliqua* is the commoner. Linné places his *Sisymbrium Nasturtium aquaticum* at the head of the first division, *siliquis brevibus*, and the synonym *Sisymbrium Cardamine*, cited by him from Leonhard Fuchs, is, according to the accompanying figure (under 413 of the German folio edition), also referable to the short-fruited variety.‡ From this I must suppose that Linné had before him the short-fruited form. The same can be presumed from the words *siliquis pedicellum subaequantibus* adopted by other authors in their diagnoses of *Nasturt. offic.*, for they agree well with the var. *brevisiliqua*, but not with var. *longisiliqua*. I have the latter in my herbarium from the Golden Plain, where it occurs near the Numburg, and also from the Berlin flora.—The examples of *Nasturt. siifolium* which I have from the Dresden flora, all belong, that is to say as far as they possess better-developed fruits, to the short-fruited form.—In the *Fl. Excurs.* p. 683, Reichenbach refers under *N. microphyllum* to a *N. turfosum* Kz., which comes from Chile, and differs from the former, to which it stands nearest, in having a *siliqua elongata*. Unfortunately I have been unable to learn anything further about this Chilean plant, but since the watercress, with its in any case very wide distribution, also occurs in Chile, as I see from a quotation from Cl. Gay's *Flora Chilena* in

* " Rob. Brown says (*Vermischte bot. Schriften V.* 51) : 'fl. a Majo in Julium,' which is too short.

† " To the Cruciferae with adventitious shoots regularly occurring on the roots, enumerated *l.c.*, I can now add a few that I have since investigated more fully . . . . " [long footnote, not relevant to *Nasturtium officinale*].

‡ " The illustration which Dodonaeus gives in the 1616 edition, and which represents the watercress on a reduced scale, I should be inclined to refer rather to the long-fruited form, from the proportion of the siliquae, which are designated as *tenues* and *oblongae*, to the pedicels.

an article by Chatin on the watercress, published in *La Belg. Horticole*, 1858 [*recte* 1859], p. 19, it would not be surprising if *N. turfosum* were identical with the var. *longisiliqua*.

" I should like to remark further that the Watercress, in both its varieties, is very liable to various kinds of abnormalities in its inflorescence[1]. On a couple of walks I found the following monstrosities. Beneath the lowermost flower, or beneath one of the lowest flowers, there very frequently occur leafy bracts, which are generally adnate to the stem for a distance.* Often such a bract occurs only beneath a flower placed higher up on the axis of the raceme.—It likewise no less frequently happens that the raceme-axis grows out from the apex and there bears small foliage leaves, from the axis of which issue short branchlets mostly commencing with simple leaves.—Sometimes there occurs on the raceme-axis, after it has borne several normal flowers, a leaf (or 2 or 3 leaves) bearing in its axil a leafy shoot ; after which further pedicels occur on the raceme-axis.†—There was a very remarkable case where a lateral fruit occurred, below a fruit from beneath which the other flower-parts had already long fallen : it had a 2–3 line long pedicel and this was situated over the place where one of the two lower or lateral sepals had been, the scars of which were still recognizable. There could be no doubt concerning the situation, since the pedicel of the fruit belonging to it stood opposite a valve of the primary siliqua. The valves of the former stood at right angles to those of the latter. I have observed this case on three occasions. Once indeed I saw two accessory fruitlets, one on each side of the primary fruit. One would suppose that the lower sepals have here taken over the rôle of bracts. I have previously seen a similar phenomenon in other Cruciferae, but have not satisfied myself sufficiently on the insertion and situation of the accessory fruits.—Twice I have observed a lateral sepal that had become leafy and had persisted thus below the ripe fruit.—Above the pedicel of certain fruits, in the axil which this forms with the raceme-axis and from which accessory roots sometimes spring, I found a small bud, apparently the rudiment [primordium] of a flower. This situation is unusual in that the accessory buds in our plant are inferior in the axil of foliage leaves.

" Sondershausen, September 1861. "

Despite this very careful and detailed account, Irmisch's two varieties are referred to only very cursorily in most German floras. The least perfunctory treatment seems to be that by Glück in Pascher, *Die Süsswasser-Flora Mitteleuropas*, **15,** 268 (1936), where some measurements are given : var. *brevisiliqua*, with "small short fruit," 5–7.5 mm. long, 1.5–1.8 mm. thick, pedicel 4–6 mm. long (showing considerable differences from Irmisch's figures) ; var. *longisiliqua*, 17–25 mm. long, 1.2–2 mm. thick, pedicels 8–14 mm. long (agreeing with Irmisch). It seems possible, however, that the var. *brevisiliqua* as defined by Glück may be the triploid hybrid, *N. microphyllum* × *N. officinale* (i.e., *N. uniseriatum* × *N. officinale* in Howard & Manton's terminology), and not *N. officinale* itself, as the hybrid is characterized by its very short fruits. This triploid hybrid is quite a common member of the flora of N. Europe, and is also cultivated —*cf.* Howard in *Agriculture*, **53** (10), 453–6, c. tab. & fig. (1947).

Summary

Attention is drawn to some probable earlier synonyms of *Nasturtium uniseriatum* Howard et Manton. The earliest of these, probably providing the valid name for the species, is *Nasturtium microphyllum* Boenninghausen ex Reichenbach (1832). Evidence in favour of this is the large flowers,

[1] [Cf. Arber in *New Phytol.* **30,** 184–195 (1931) ; Halket in *op. cit.* **31,** 284–6 (1932).]

* "This case was also observed by Wydler, cf. *Flora* 1859, p. 297.—At the base of the pedicel of *N. font.* I also saw the rudimentary bracts, the common occurrence of which in the Cruciferae has been noticed by Norman in his learned paper : Quelques observations de morphol. végét., etc. " [Vide J. M. Norman in *Ann. Sci. Nat.*, Sér. 4, **9,** 105–141 (1858).]

† " In *Sinapis arvensis* I found another case : the raceme-axis, after bearing a few single flowers, produced a small lateral flowering-raceme (the axis of which had no leaf below the flowers) ; sometimes this lateral raceme was situated in the axil of a foliaceous mother-leaf, sometimes the latter was absent.

long pedicels and slender young pods shown in Reichenbach's figure, and the interpretation of *N. microphyllum* in this sense by French botanists from Boreau (1857) onwards. It is recommended that the tetraploid watercress be known as *N. microphyllum* Boenningh. ex Reichenb., *sensu* Boreau (1857), pending definite evidence to the contrary.

Should *N. microphyllum* be shown to be a form of the diploid watercress, *Pirea olgae* (Regel) Durand ex Prantl (*Dictyosperma olgae* Regel, 1882), which certainly represents the tetraploid, will provide the earliest specific epithet for the latter.

A list is given of localities for the tetraploid, from Europe, Asia, Africa and North America, additional to those cited by Lipsky (1900).

A translation of an important paper by Th. Irmisch (1861), containing much biological and morphological information on the watercresses, and providing, in *N. fontanum* var. *longisiliqua* Irmisch, the earliest certain varietal name for the tetraploid, is appended.

A probably natural hybrid in Hymenocardia Tul.

Investigation by Miss E. A. Bruce and the writer of some puzzling gatherings of *Hymenocardia* collected in Sierra Leone by Mr. F. C. Deighton has revealed the occurrence of what are in all probability natural hybrids. At Mano Bonjema, Mr. Deighton informs us, *H. lyrata* Tul. and *H. heudelotii* Muell. Arg. were growing commonly all mixed together. From among them was collected Deighton 3710 which, on examination at Kew, appeared intermediate beween the two species, and hybrid origin was suspected. The leaves of this gathering are shaped somewhat like those of *H. heudelotii* but are more acuminate than is normal in that species, whilst the fruit has the broad outline of that of *H. heudelotii* combined with the conspicuous wings of *H. lyrata*.

A second gathering (Deighton 3185) from a different locality, Mano (Luawa), also appears to be a hybrid. It has the leaves of *H. lyrata* and fruits similar in proportions to those of Deighton 3710 but smaller, and with a strong tendency to unequal development of the wing, a character likely to have been derived from *H. heudelotii*, the fruits of which are practically wingless.

Mr. Deighton, when informed that it was suspected that these two gatherings of his might be hybrids, replied " I certainly suspected that my 3710 was a hybrid when I collected it. . . . . My 3185 looks very similar, and the road through Mano (Luawa) runs close to a big river." Mr. Deighton informs me that *H. lyrata* is the abundant forest tree in the south of Sierra Leone, extending to the north in riverine forest, whilst *H. heudelotii* is common in wetter places in the south and along river banks throughout the country.

The writer would be glad to receive information regarding any suspected occurrence of hybridity in *Hymenocardia* from Sierra Leone or elsewhere in Africa, especially between either of the above species and *H. acida* Tul.

E. Milne-Redhead.

THE GENUS CHONEMORPHA G. DON (APOCYNACEAE).

D. Chatterjee.

The earliest plant referable to the genus *Chonemorpha* was found in Rheede's Hortus Malabaricus **9** (1689), 7, tab 5 and 6 under the only name " Belutta-Kaka-Kodi." In 1812, M. R. Smith from Sylhet, Assam, sent to the East India Company's Botanic Garden in Calcutta a plant or plants known as " Harkee " in Bengali. This was a climber with sweet-scented white flowers. Roxburgh flowered this and left a drawing. He described it as *Echites macrophylla*,[1, 2] and identified it as the same as Rheede's figure (l.c). In 1837 G. Don proposed the genus *Chonemorpha*,[3] from the funnel-shaped corolla of this and some other plants. He included a number of species under this new genus but all of them are not really referable to it as is shown at the end of this paper. Horsefield was in Java at this time and found and figured a similar plant (no. 476 of his collection of drawings at Kew). The figure agrees with his plant no. 259 from Java in the Kew Herbarium. Miquel called Horsefield's plant *Chonemorpha mollis*.[4] Wallich's Catalogue refers to a number of *Echites* which are nothing but *Chonemorpha macrophylla* (Roxb.) G. Don (Wall. Cat. 1656, 1657, 1658). In 1911, Ridley[5] proposed the name *C. rheedii* for the Ceylon plant and the name *C. penangensis*[5] for a Malayan plant of the same genus. But in 1923 Gamble[6] regarded the Ceylon and South Indian specimens as the same as Wight's Icones copying of Roxburgh's drawing of the Sylhet plant.[7]

A number of new species have been described from West China, French Indo-China, and the Malay Islands during the past forty-five years, and it is now possible to get a better idea of the genus as a whole than it was prior to 1900. Unfortunately no one has attempted a review of the group excepting Furtado[8] who has dealt with only four or five species. Of these *C. fragrans* (Moon) Alston and *C. mollis* Miq. have been reduced in this paper to *C. macrophylla* (Roxb.) G. Don, and it is very doubtful whether *C. assamensis* is distinct from *C. macrophylla*.

While working out some sheets of *Chonemorpha* in the Kew Herbarium it was found necessary in view of ampler herbarium materials to differ considerably from Furtado's fragmentary review (l.c.), and it was thought that a review of the genus as a whole should be attempted. I regret I could not see four species (*C. assamensis*, *C. eriostylis*, *C. graciliflora* and *C. yersini*) of the genus, but I have indicated my remarks against each of these in the enumeration.

A Key to the other species is as follows and it is hoped that the species not seen by me may also be fitted in the proposed Key without changing the general plan very much.

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[1] Roxb. Hortus Bengalensis, 20 (1814).
[2] Roxb. Flor. Indica **2,** 13 (1832).
[3] Don. Gen. Syst. **4,** 76 (1837).
[4] Miq. Flor. Ind. Bat. **2,** 444 (1856).
[5] Agri. Bull. Str. & Fed. Mal. States **10,** 146–48 (1911).
[6] Flor. Madras **2,** 818 (1923).
[7] Wight Icones, 432 (1843)
[8] Gard. Bull. Str. Settlements **9,** 113-117 (1935).

Key to the species of *Chonemorpha* examined.

Calyx with a distinct tube
- Corolla tube long 4–5 cm. .. .. .. **grandeareana** (5)
- Corolla tube shorter than 4 cm.
  - Calyx tube shorter than the lobes .. **macrantha** (7)
  - Calyx tube equalling or longer than the lobes
    - Calyx tomentose
      - Tube 20 mm. inflated, inflorescence rhachis hirsute .. **megacalyx** (9)
      - Tube 8–14 mm., cylindrical
        - Mouth of open corolla 5 cm. in diam. .. .. **penangensis** (10)
        - Mouth of open corolla 2·5 cm. in diam. .. **splendens** (11)
    - Calyx glabrescent
      - Leaves elliptic, base distinctly cordate .. .. .. **elliptica** (2)
      - Leaves broadly ovate, base not cordate .. .. .. **macrophylla** (8)

Calyx deeply 5-partite
- Lobes broadly lanceolate, imbricate, climber **griffithii** (6)
- Lobes narrow conical, valvate, shrub .. **valvata** (12)

Enumeration.

1. **Chonemorpha assamensis** *Furtado* in Gard. Bull. Str. Settlements **9,** 115 (1935). I have not seen the type. The original description (l.c) is very meagre. The plant differs from *C. macrophylla* as stated in the text in having a shorter and glabrous calyx. I have seen two sheets of *C. macrophylla* from Lushai Hill, Assam (*Mrs. Parry* 333), where the calyx has a structure similar to that stated by Furtado as occurring in his species *C. assamensis*. I do not consider Mrs. Parry's sheet different from *C. macrophylla* and I have my doubts whether *C. assamensis* can have an independent existence on the characters stated unless supported by other distinct characters. It may ultimately prove to be just a variation of *C. macrophylla*.

2. **Chonemorpha elliptica** (*Blanco*) *Merrill et Rolfe* in Philipp. Journ. Sci. **3,** 121 (1908). *C. blancoi* Merrill in Enum. Philipp. Fl. Plants **3,** 335 (1923). *C. macrophylla* Vidal non G. Don Cat. Pl. Prov. Manila 36 (1880). *Tabernaemontana elliptica* Blanco in Fl. Filip. 115 (1837) non Thunb. This species is endemic in the Philippines. The leaves are elliptic and with cordate base. It resembles *C. macrophylla* in having a glabrescent calyx but the flowers are much smaller.

Distribution. Philippine Islands : Luzon, Manila, *Vidal* 3265 ; *Loher* 3881 ; Rizal, *Merrill* 2704 ; *Maximo Ramos* 1065 ; *Merrill* 482.

3. **Chonemorpha eriostylis** *Pitard* in Flor. Gen. Indo-Chine **3,** 1247 (1933).

This appears to be a good species but I have not seen any specimen.
Distribution. Indo-China : Annam.

4. **Chonemorpha graciliflora** *Pitard* in Flor. Gen. Indo-Chine **3,** 1248 (1933).

I have not seen the type but from the description I am convinced it is a good species.

Distribution. Indo-China : Laos.

5. **Chonemorpha grandeareana** *Pierre ex Spire* in Planch. Prodr., 296 (1894), nomen ; Spire, Caout. Indo-Chine, 72 (1906) ; Flor. Gen. Indo-Chine **3,** 1252 (1933) ; Flor. Siam. Enum. **2,** 474 (1939).

This is a species with very long corolla tube. The plant is distinct in the genus because of this character and can be easily identified in the Herbarium.

Distribution. Indo-China ; Annam, Laos. Cochinchina. Siam.

6. **Chonemorpha griffithii** *Hook. f.* Flor. Brit. Ind. **3,** 662 (1882).

This is also a very distinct species of the genus and is found in East Himalaya and Assam. It differs from almost all other species in having a 5-partite calyx in distinction from others where the calyx has a distinct tube. This peculiar calyx was noticed in Hooker's description and he doubted whether this species can remain in the genus.

I have examined most of the species belonging to *Chonemorpha* and find that the *calyx* is very variable in this genus, and extreme and intermediate forms occur. The calyx is deeply 5-partite and *valvate* in *C. valvata.* It is 5-partite and *imbricate* in *C. griffithii.* The next stage, where a short and distinct calyx tube is formed, is seen in *C. macrantha.* In *C. megacalyx* the tube is best developed, and is united and about 20 mm. long but with distinct lobes. Lastly in *C. penangensis* the tube is so well developed that the calyx lobes are almost reduced to small teeth-like structures. In view of such a variation *C. griffithii* may well remain in the genus.

Distribution. East Himalaya. Sikkim : Permeakley, *T. Anderson* 837 ; *T. Anderson* 302 (2 sheets) ; Kurseong, *C. B. Clarke* 28094, 11782A ; Kurseong, *Gamble* 3221 A & B ; Rungoo Valley, *Gamble* 793A ; Pateabong, *Gamble* 8209.

Assam : Khasia, *Griffith,* without number ; *Simon* 60 ; Naga Hills, Kilomi, *N. L. Bor* 4489.

7. **Chonemorpha macrantha** *Pitard* in Fl. Gen. Indo-Chine **3,** 1249 (1933) ; Craib in Flor. Siam. Enumer. **2,** 474 (1939).

This is a species with short but distinct calyx tube. It approaches very closely *C. valvata* where the calyx tube is absent.

Distribution. Indo-China. Siam. S.W. China : Yunnan, *Forrest* 24368 (new record).

8. **Chonemorpha macrophylla** (*Roxb.*) *G. Don* in Gen. Syst. **4,** 76 (1837). DC. Prodrom. **8,** 430 (1844) ; Miq. Fl. Ind. Bat. **2,** 444 (1856) ; Hook. f. Flor. Brit. Ind. **3,** 661 (1882) ; Trim. Flor. Cey. **3,** 138 (1895) ; Kurz For. Fl. Brit. Burma **2,** 187 (1877) ; Gamble Trees etc. of Darjeeling 56 ; Wight Icones Pl. Ind. Or. 432 (1843) ; King & Gamble Mat. Flor. Mal. Penin. **4,** 693 (1907) ; Gamble Flor. Madras 818 (1923) ; Furtado in Gard. Bull. Str. Settlements **9,** 115 (1935).

C. macrophylla var. *grandis* A. DC. Prodrom. **8,** 450 (1844). *C. fragrans* (Moon) Alston in Annal. Roy. Bot. Gard. Peraden. **11,** 203 (1929) ; Gard. Bull. Str. Settlements **9,** 115 (1935). Flor. Ceylon **6,** 192 (1931) ; Kandy Flora 47 (1938). *Chonemorpha fragrans* (Moon) Alston is the same plant as *C. macrophylla* (Roxb.) G. Don as shown by Alston in Flor. Cey. **6,** 192 (1931), and cannot be kept separate as proposed by Furtado (l.c.). This is clear from the examination of herbarium material and also the synonymy given by Alston in Flor. Ceylon (l.c.). It remains to determine which of the two is the correct name. Moon's " Catalogue of Indigenous and Exotic plants of Ceylon " was published after June 1824 and not in 1821 as stated in Flor. Ceylon (l.c.). Roxburgh's Flora Indica Vol. **2** was published in March 1824. Unfortunately, following Alston's synonymy (l.c.), I could not find the description of *Echites macrophylla* in the 1824 edition of Vol. **2,** 13. The description of Roxburgh's plant appears in the second edition of Flora Indica Vol. **2,** 13, published in 1832. Carey in the preface of the second edition says that the edition is a reprint of the first edition of 1824. I do not know whether Alston made a mistake in quoting 1824 for 1832 in his synonymy for *C. fragrans* (l.c.) or assumed the first date (1824), as the second edition was just a reprint of the first edition. Even on this assumption (which I very much doubt) *Echites macrophylla* Roxb. has a priority of about three months over *Echites fragrans* Moon (nomen nudum)—both being published in 1824. *C. rheedii* Ridley in Agric. Bull. Str. & Fed. Mal. States **10,** 146 (1911). *C. mollis* Miq. in Flor. Ind. Bat. **2,** 444 (1856) ; Kurz Journ. As. Soc. Bengal **46,** 257 (1877) ; Furtado Gard. Bull. Str. Settlements **9,** 116 (1935), p.p. *C. maerophylla* Kurz in Journ. As. Soc. Bengal **46,** 257 (1877). The specific epithet is evidently a printing mistake for *C. macrophylla*. *Echites macrophylla* Roxb. in Hort. Bengalensis 20 (1814), nomen ; Flor. Indica **2,** 13 (1832), descript. ; Wall. Cat. 1657 non *Echites macrophylla* H. B. K. in Nov. Gen. et Spec. **3,** 218 (1819). This last is a different plant from South America and is nothing but *Mandevilla hirsuta* (A. Rich.) K. Schum. *E. elegans* Wall. Cat. 1656, nomen. *E. grandis* Wall. Cat. 1658, nomen. *E. latifolia* Wall. Cat. 1657, nomen. *E. fragrans* Moon Cat. 20 (1824), nomen nudum. " Belutta-Kaka-Kodi " Rheede in Hort. Malabaricus **9,** 7, tab. 5 & 6 (1689).

Distribution. India. East Himalaya. Sikkim : *Hooker* ; *T. Anderson* 307. North Bengal : Tindheria, *Gamble* 3223A, 32238 ; Buxa Bedul (?), *Gamble* 7698 ; Rungoo Valley, *Treutler* 144 ; Duars, Muraghat Forest, *Haines* 5727. Assam : Sylhet, *Wall. Cat.* 1657 (type !) ; *Jenkins ; Hooker* 1618 ; Lushai Hills, *Mrs. Parry* 333 (2 sheets). West Himalaya : Kumaon, *Wall. Cat.* 1558 : Kumaon, *Falconer ;* Mahargiri, *Strachey et Winterbottom ;* Sarjee Valley, *Duthie* 5769. Bombay : *Dalzell ;* N. Kanara, *Sedgewick and Bell* 6051, 3960 ; Gudehalli, Karwar, *Sedgewick and Bell* 6792. South India : Courtalum, *Wall. Cat.* 1656 ; *Wight* 1880 (2 sheets). Canara, *Hohenacker* 158 ; *Wight.*

Ceylon : *Mackenzie ; Mrs. Walker.*

Burma : Lashio, *Lace* 5838 ; Maymyo, *Lace* 6179 ; Rangoon, *McClelland ;* Moulmein, *Parish.*

Andamans : Winkeolegang, *Parkinson* 619. South Andaman, *Kurz* 1842.

Malay Peninsula: Perak, *Ridley* (type of *C. rheedii*).

Java : *Horsefield* 259 ; *Zollinger* 814 ; Buitenzorg, *Bakh* 7738 ; *Koorders* 20353B.

9. **Chonemorpha megacalyx** *Pierre* in Spire Caout. Indo-Chine, 75 (1906) ; Flor. Gen. Indo-Chine **3,** 1250 (1933). This is a species with the longest calyx tube and hirsute inflorescence rhachis.

Distribution. Indo-China: Laos, *Spire* 17. S.W. China: Yunnan, Szemao, *Henry* 12103; 12103A (new record !).

10. **Chonemorpha penangensis** *Ridley* in Agric. Bull. Str. & Fed. Mal. States **10,** 147 (1911). Flor. Mal. Penin. **2,** 360 (1923). Gard. Bull. Str. Settlements **9**, 116 (1935). This is a species with long hairy calyx and very short teeth-like lobes.

Distribution. Malay Peninsula : Penang, *Curtis* 832 (co-type !) ; Malay, *Maingay* 1074, 1725 ; Pahang Kota Tongkat, *Evans*.

11. **Chonemorpha splendens** *Chun et Tsiang* in Sunyatsenia **2,** 157 (1934). This is a species with smaller flowers and very long acuminate tomentose follicles.

Distribution. China : Hupeh, Hainan, *C. Wang* 33364 (type !) ; Hainan, Dung Ka to Wen Fa Shi, *N. K. Chun & C. L. Tso* 43838.

12. **Chonemorpha valvata** *Chatterjee* sp. nov. ; *Chonemorpha macranthae* Pitard arcte affinis sed pedunculis longioribus, calyce 5-partito segmentis fere liberis valvatis brevioribus angustioribusque differt.

Shrub 2–3 m. *Stem* terete rusty tomentose specially on the younger parts and undersurface of leaves, rugulose with lenticel scars. *Leaves* opposite, petioled, broadly ovate-elliptic, apex variable, usually shortly acute to subobtuse, base narrow to rounded, midrib entire, channelled and hairy above, slightly raised below, midrib and primary veins often of darker colour, primary veins 7–9 pairs diverging from the midrib at regular intervals with slight tendency to form loops near the margin, lamina subcoriaceous and densely tomentose on the lower surface, glabrescent on the upper, 20–25 cm. long, 10–14 cm. wide ; petiole 2–3·5 cm. long, thinly rusty tomentose. *Inflorescence* on long peduncle, 14–20 cm. long, few- to many-flowered, corymbose in the last quarter ; a number of narrow conical to lanceolate bracts 10–12 mm. long are present at the base of the corymbose structure as well as at the base of pedicels ; bracts softly tomentose on both surfaces. *Flowers* large, fleshy, lake purple, with white inside the tube ; fragrant, hypocrateriform, mouth 6–7 cm. in diam., corolla lobes slight and gently twisted to the left in bud. *Calyx* 5-partite ; lobes narrow conical, valvate, thinly pubescent outside, glabrous within, not veined, 12–13 mm. long 2–3 mm. wide, acute to acuminate with 5 irregularly semicircular glands near the base inside, margins of glands undulate. *Corolla* tube slightly inflated near the base, narrower in the middle, 7 cm: long in bud including lobes about 3 cm. in diam., lobes obliquely obovate, glabrous papery, thinly but distinctly multinerved, margin subentire. *Stamens* 5, short, included within the tube, epipetalous, attached to the tube near the base ; anthers long sagittate, tapering gradually from the base to an acuminate apex, introrse, 11 mm. long ; filaments flat, short convex, bristly, almost closing the cavity of the tube by their convex surfaces, except for a small space near the centre through which the style passes. *Carpels* 2 ; ovaries

glabrous, free, but style and stigma united ; style and stigma covered within the dome formed above them by the 5 introrse anthers ; style filiform, glabrous except near the top below the stigma where it is thinly hairy ; stigma flattened and circular, plate-like with a central broadly conical rugulose bifid structure with a constriction between the two parts ; ovary with style and stigma about 16 mm. long. *Disc* cupular, entire, glabrous.

Distribution. Burma. Upper Burma, Mogok, 1,300 m., 13.6.1914, *A. Rodger* 120.

S.W. China : Yunnan, west of Tengyueh, 1,600 m., lat. 25° N., 5.1912, *G. Forrest* 7590 (type !) ; western flank of Tali Range, lat. 25° 40′, 8.1913, *G. Forrest* 11603 (2 sheets).

Siam : Doi Sutep, 1,700 m., 30.4.1931, *Mrs. Cunniff.*

C. valvata resembles *C. macrantha* but differs in being a shrub (*C. macrantha* is a climber) with 5-partite (almost free) calyx and longer peduncle.

13. **Chonemorpha yersini** *Vernet ex Spire* in Bull. Econ. Indo-Chine 859 (1902). Flor. Gen. Indo-Chine **3,** 1251 (1933). *C. harmandiana* Pierre in Planch. Prod. Apocyn. 296 (1894). I have not seen any specimen of this species.

Distribution. Indo-China : Laos.

Doubtful and excluded species of *Chonemorpha.*

C. antidysenterica G. Don = **Holarrhena antidysenterica** (*Roth.*) *Wall. ex A.DC.*

C. bantamensis G. Don = **Ichnocarpus moluccanus** *Miq.*

C. blancoi Merrill = **Chonemorpha elliptica** *Merrill et Rolfe.*

C. convolvuloides G. Don = **Calonyction aculeatum** (*L.*) *House.*

C. coriacea G. Don = **Anodendron coriaceum** *Miq.*

C. cristata G. Don = **Aganosma marginata** (*Roxb.*) *G. Don.*

C. densiflora G. Don = **Ecdysanthera densiflora** *Miq.*

C. dichotoma G. Don = **Aganosma acuminata** (*Roxb.*) *G. Don.*

C. elastica Merrill = **Rhyncodia rhynchosperma** (*Wall.*) *K. Schum.*

C. fragrans (Moon) Alston = **C. macrophylla** (*Roxb.*) *G. Don.*

C. grandiflora G. Don = **C. macrophylla** (*Roxb.*) *G. Don.*

C. harmandiana Pierre = **C. yersini** *Spire.*

C. inflata G. Don = **Ecdysanthera inflata** (*Bl.*) *K. Schum.*

C. malabarica G. Don I do not know what plant Don had for this. I agree with Hooker F.B.I. **3,** 662 (1882) in excluding this from the genus.

C. mollis Miq. = **C. macrophylla** (*Roxb.*) *G. Don.*

C. mollissima Boerl. I could not place this in any genus. Boerlage's Flor. van Ned. Ind. **2,** 400 (1899) does not give a description of the plant.

C. nouettiana Pierre = **Nouettia cochinchinensis** *Pierre.*

C. pubescens G. Don = **Holarrhena antidysenterica** (*Roth*) *Wall. ex A.DC.*

C. rheedii Ridley = **C. macrophylla** (*Roxb.*) *G. Don.*

C. reticulata G. Don = **Cryptolepis buchanani** *Roem. et Schult.*

C. vestita G. Don = **Wrightia tomentosa** *Roem. et Schult.*

EMPOGONA HOOK. F. AND ITS RELATION TO TRICALYSIA DC.

J. P. M. Brenan
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In 1871 Sir J. D. Hooker based his new genus *Empogona* on a plant collected by Kirk on the shore of Lake Nyasa in southern Nyasaland. This plant he named *E. kirkii*. When Hooker took up his genus again in his elaboration of the *Rubiaceae* for the " Genera Plantarum " in 1873 it was still monotypic. Additions to the genus were slow ; in 1887 an alleged variety—*glabrata*—of *E. kirkii* was described by Oliver, but it was not until 1900—nearly thirty years after the publication of *E. kirkii*—that a second species, *E. junodii*, was described by Schinz. Since then two further so-called species have been added—*E. allenii* Stapf in 1906 and *E. taylorii* S. Moore in 1925. Finally, in 1937, *E. kirkii* var. *australis* was described by Schweickerdt.

While examining some east tropical African *Rubiaceae*, the writer was struck by the remarkable similarity of the flowers of certain species, hitherto placed in *Tricalysia*, to those of *Empogona kirkii*. Further investigation only served to emphasise this affinity. It became therefore necessary to decide whether *Empogona* should be merged with *Tricalysia*, or whether *Empogona* should be retained as a distinct genus and certain species of *Tricalysia* transferred to it. For reasons to be dealt with later on, the writer is unable to uphold the distinctness of *Empogona*.

The affinity between the species of *Tricalysia* and *Empogona* has already been noticed by Baillon, who, in Adansonia **12,** 179–213 (1878), published a paper entitled " Mémoire sur les genres Canthium et Hypobathrum ". Only with the second part of this paper (that dealing with *Hypobathrum*) are we concerned here. Now *Hypobathrum* was based by Blume (Bijdragen tot de Flora van Nederlandsch Indië, 1007 : 1826) on *H. frutescens* Bl., a Javanese plant. Baillon (*l.c.*) took up Blume's genus, regarding it in a very wide sense indeed, including under it as subsections the following genera, among others : *Empogona*, *Feretia*, *Kraussia*, *Tricalysia*, *Zygoon*, etc. This view has not been adopted by subsequent writers—at least not by those dealing with the African genera concerned. K. Schumann in his treatment of the *Rubiaceae* (in Engl. et Prantl, Nat. Pflanzenf. **4,** pt. 4, 80 : 1891), restricts *Hypobathrum* to three species from the Malayan archipelago. Hooker's previous account in the " Genera Plantarum " also treated *Hypobathrum* in a restricted sense (this, however, was prior to Baillon's paper). Though these genera are doubtless very closely related, *Hypobathrum* appears to be separable from *Tricalysia* by the included anthers and the short, rounded corolla lobes, possibly also by the position of the placenta.

In Kew Bull. 1931, 254–257, Bullock revived *Kraussia* as a genus, separating it from *Tricalysia* principally by the form of the style, at the same time leaving in *Tricalysia* certain species that had previously been included in the section *Kraussia* of that genus. It is in certain species of this residue that the very strong affinity with *Empogona* is found.

Hooker originally separated *Empogona* from *Tricalysia* by the ecalyculate flowers and the form of the anthers; he originally described the anthers as sessile and this assertion is repeated in the " Genera Plantarum ". The anthers are, however, not sessile, being dorsifixed and versatile and having a very short filament about 1.2 mm. long (in *E. kirkii*) attached to the anther at about $\frac{1}{4}$ the length of the latter above its base. A filament has been observed in all the species of *Empogona* and is visible on the type specimen of *E. kirkii* but, being behind the anther and often more or less concealed by the mass of woolly hair that covers the throat of the corolla, may be sometimes difficult to discern. Hiern is thus correct in describing (Fl. Trop. Afr. **3,** 115 : 1877) the anthers of *E. kirkii* as subsessile. Though in most species of *Tricalysia* the filaments are appreciably longer than those of *Empogona*, yet in various species (e.g. *T. reticulata* (Benth.) Hiern, *T. pobeguinii* Hutch. et Dalz.) they may be as short as 1.5 mm. The writer cannot consider that so slight a difference is of importance for retaining the two genera as separate. In *Empogona* a conspicuous dilated appendage is noticeable at the apex of each anther; this contrasts sharply with the muticous or minutely apiculate anthers of the majority of *Tricalysia* species. Even this character is, however, by no means constant. The length of the appendage is variable, even within the limits of *Empogona kirkii* itself; in *Tricalysia djumaënsis* De Wild. appendages of a similar shape to and as long as some seen in *Empogona* are combined with the comparatively long filaments and other characters of *Tricalysia*. The presence or absence of a calyculus is a further character upon which emphasis has been laid. In *Empogona* the bracteoles are normally separate and alternate, but sometimes may be subopposite or opposite, all three arrangements being present on the same shoot. In *Tricalysia ovalifolia* Hiern, which is unquestionably congeneric with *Empogona kirkii*, the bracteoles are sometimes opposite and connate into a cupule. The position of the bracteoles on the pedicel is variable. In *Tricalysia* the bracteoles are very commonly fused into the characteristic cup or calyculus embracing the base of the calyx, and this arrangement is certainly very different from that of *Empogona*. Unfortunately a well-marked calyculus is by no means always present in *Tricalysia*. The bracteoles may be opposite and free or connate only near the base, as in *T. macrophylla* K. Schum. In material of an apparently undescribed species of *Tricalysia* from the Gold Coast, the bracteoles are always free, and, it appears, indiscriminately alternate, subopposite or opposite. I have refrained from bringing forward in evidence the remarkable species *T. welwitschii* K. Schum. and *T. anomala* E. A. Bruce, which have the bracteoles subulate or linear-lanceolate and free or almost so; in no other characteristics do they show any close affinity with *Empogona*, and in facies they are very different both from *Empogona* and from the great majority of *Tricalysia*; it is probable that, when a complete revision of the latter difficult and widespread genus shall be made, it may be found desirable to separate generically these two species.

It has already been mentioned that in *Empogona* the throat of the corolla is concealed by a characteristic dense mass of woolly hair, upon which the anthers appear to sprawl. A similar development of indumentum is found in various species of *Tricalysia* (e.g. *T. coriacea* (Benth.) Hiern), though perhaps the mass is not quite so dense and protuberant as it is in

Empogona ; but the difference, if any, is of the slightest degree. Thonner (Flowering Plants of Africa, 526–7 : 1915) endeavoured to contrast the fascicled flowers of *Tricalysia* with *Empogona*, whose flowers were described as solitary or 2–3 together. This distinction is quite worthless and, in fact, non-existent, as the arrangement described for *Empogona* occurs not infrequently in *Tricalysia*, and the inflorescences in *Empogona* may be more than three-flowered. It is perhaps worth noting here in addition that the density of the inflorescence is subject to considerable variation in both genera.

Empogona is thus separable by no satisfactory character from *Tricalysia* and it seems impossible to maintain it as a distinct genus. Nevertheless, the species hitherto placed in *Empogona*, together with a few species of *Tricalysia* which are closely related, form a fairly well-defined group possessing several characters which are rare or sporadic in the rest of *Tricalysia*, where they occur separately in species showing in other ways no very close affinity to *Empogona*. Furthermore this group, as far as the inflorescence is concerned, possesses a common facies which, in the writer's experience, renders it easily separable from the rest of *Tricalysia*. The writer therefore proposes to regard this group as a section of *Tricalysia*, equivalent in rank to the other subdivisions of the genus enumerated by K. Schumann (in Engl. et Prantl, Nat. Pflanzenf. **4,** pt. 4, 81–2: 1891). This must not, however, be taken to imply that the writer is necessarily in agreement with the delimitation of K. Schumann's sections ; some of the characters employed are clearly most unsatisfactory, but the solution of these difficulties must await a full revision of the genus.

The new section is distributed through E., S. central and S. E. Africa, extending from Kenya in the north to Natal in the south. It appears, with the exception of the isolated occurrence in Sierra Leone of the somewhat doubtfully placed *T. reflexa* Hutch., to be quite absent from the great rain-forest area of W. and central Africa, where, however, numerous other species of *Tricalysia* occur. It almost certainly occurs in Madagascar ; one, at least, of the species mentioned by Baillon from this region, *Hypobathrum albicaule*, almost certainly belongs here. It is of interest that he remarks concerning this species (*l.c.*) : " Le nom générique adopté par Boivin [*Eriostoma albicaulis* Boivin ex Baill., *l.c.*, *pro synon.*] indique que la gorge de la corolle est tout obstruée de poils longs et serrés. Par là, et par ses divisions réfléchies, cette corolle est tout à fait celle de l'*Empogona*, plante absolument congénère de celle-ci ".

I am very grateful to the authorities at Kew and the British Museum (Natural History) for opportunities of examining material of this group ; my thanks are especially due to Mr. J. E. Dandy.

Tricalysia A. Rich. ex DC. Sect. **Empogona** (*Hook.f.*) *Brenan*, stat. nov.—*Empogona* Hook.f. in Hook. Ic. Pl. **11,** 72, t. 1091 (1871) ; Benth. et Hook.f., Gen. Pl. **2,** 94—95 (1873); Hiern in Oliv., Fl. Trop. Afr. **3,** 114—115 (1877) ; K. Schum. in Engl. et Prantl, Nat. Pflanzenf. **4,** pt. 4, 80 (1891). *Tricalysia* Sect. *Kraussia* K. Schum. *l.c.* 81, *p.p.*, non *Kraussia* Harv. Flores axillares, fasciculati vel laxiuscule cymosi (raro inflorescentiae uniflorae), distincte sed nonnunquam breviter pedicellati ;

bracteolae alternae, raro suboppositae vel oppositae, liberae vel rarissime connatae, nunquam calyculiformes ; fauces collorarum pilis lanuginosis densissimis exsertis obtectae ; filamenta staminum brevissima ; antherae apice longe appendiculatae.—Typus : *Empogona kirkii* Hook.f., non *Tricalysia kirkii* Hiern.

Key to the Species of Sect. Empogona of Continental Africa.

Plants evergreen ; leaves persistent until the twigs have become coated with bark, usually coriaceous or subcoriaceous when mature (sometimes firmly chartaceous), often comparatively large ; inflorescences borne in the axils of persistent leaves, but frequently also arising from the axils of fallen leaves on older twigs :

Leaves very small, up to about 2·4×0·9 cm., glabrous or nearly so . . . . 4 *T. junodii* (Schinz) Brenan

Leaves much larger, about 3–16·5×1·5–6 cm. (occasionally a few smaller depauperate leaves are present, but the normally developed mature leaves on the same shoot always exceed 3×1.5 cm.) :

Leaves 3–10×1·5–4·5 cm. :

Primary lateral nerves of leaves few, rather distant, in 4–6 pairs ; network of veins inconspicuous or scarcely visible on lower side of leaves ; mature leaves glabrous . . . . . 3. *T. sonderiana* Hiern

Primary lateral nerves of leaves more numerous and closer together, in 7–11 pairs (rarely fewer in small leaves on abnormal depauperate shoots) ; network of veins frequently (though by no means always) visible on lower side of leaves and occasionally somewhat raised ; mature leaves glabrous, or occasionally slightly pubescent, very rarely densely pubescent . . . . . 2. *T. ovalifolia* Hiern

Leaves 14–16·5×4–6·5 cm., glabrous, obtusely acuminate at apex, with 4–6 arcuate primary lateral nerves on either side of the midrib ; network of veins raised and prominent on both surfaces . . . . . 1. *T. reflexa* Hutch.

Plants deciduous ; leaves falling before the mature twigs have become coated with bark, usually chartaceous when mature (rarely subcoriaceous or coriaceous) ; inflorescences borne only on older twigs in the axils of fallen leaves, absent from axils of leaves of the current year . . . . 5. *T. allenii* (Stapf) Brenan

(For varieties, see the following account under the respective species.)

1. **Tricalysia reflexa** *Hutch.* in Kew Bull. 44 (1915).

Sierra Leone. Kessewe, N. Niagi, 17 Apr. 1913, *C. E. Lane-Poole* 131 (type, Herb. Kew.) :—bush to small tree.

This is the only species of the section hitherto found in West Africa. Hutchinson suggested no affinity for his species, but its relationship with *T. ovalifolia* seems clear. It has by far the largest leaves of any species in the section. From *T. ovalifolia* it further differs in the fewer lateral

nerves of the leaves and the form of the leaf apex ; and from *T. sonderiana* in the prominence of the vein-network beneath.

This species is also noteworthy in having but one ovule per loculus, suggesting relationship to *Coffea*, a genus with which it has otherwise very little affinity. Differences in ovule number, although much weight has been laid on them in the past, do not seem altogether satisfactory as generic criteria. Nevertheless, until more material, including fruit, of *T. reflexa* is available, its position must remain doubtful.

2. **Tricalysia ovalifolia** *Hiern* in Oliv. Fl. Trop. Afr. **3,** 119 (1877) ; K. Schum. in Engl. et Prantl, Nat. Pflanzenf. **4,** pt. 4, 81 (1891) ; [Dale], Trees and Shrubs of Kenya Colony, 143 (1936); Greenway, A Swahili-Botanical-English Dictionary of Plant Names, 30, 209, 301 (1940) ; Hora et Greenway, Check-Lists of the Forest Trees and Shrubs of the British Empire, No. 5, Tanganyika Territory, Part 1, 186 (dated 1940, published 1941).

Kenya Colony. Rabai, *Rev. W. E. Taylor* 186 (Herb. Mus. Brit.). Mida, Oct. 1930, *G.H. Donald* 452, 94* (Herb. Imp. For. Inst., Oxon.) :—shrub to 1.5 m. ; used for making arrows : vernacular name " Kifiofio ". Thicket, Kilifi, " sl.", 8 Jan. 1937, *J. Y. Moggridge* 333 (Herb. Kew.). Coast, *R. E. St. B. Baker* 1104 (Herb. Kew.) :—vernacular names (Swa.) " Ukuba Mwitu ", (Sanya) " Mkuba adasti ".

Tanganyika Territory. Coast opposite Zanzibar, Mar. 1870, *Kirk* s.n. (Herb. Kew.). Kibuguni district, 45 m., 25 Nov. 1936, *P. J. Greenway* 4769 (Herb. Imp. For. Inst., Oxon.) :—much branched, evergreen shrub up to 5 m. tall ; fruits edible ; local with *Strychnos*, *Gymnosporia* and *Lamprothamnus zanzibaricus* and *Ochna* thickets in *Brachystegia-Pteleopsis myrtifolia* open woodland on red and brown sandy loams : vernacular name (Swa.) " Mvuma nyuki ". Tanga District : Kwamkembe, 1525 m., 13 Jan. 1937, *P. J. Greenway* 4827 (Herb. Imp. For. Inst., Oxon.) :—a virgately branched shrub with small green fruits, common in *Manilkara sulcata*, *Dalbergia elata*, *Grewia*, *Annonaceae*, *Scutia myrtina* evergreen bush on a bright red sandy loam.

Zanzibar Is. *Kirk* s.n. (type, Herb. Kew.). " An sterilen Orten ", Sept. 1873, *Hildebrandt* 1177 (Herb. Mus. Brit.). Sweet-scented shrub in sandy soil near sea, *Mrs. Taylor* 62/2 (Herb. Kew.). Mwakajuni-Kurekwe, 3 Dec. 1930, *Greenway* 2642 (Herb. Kew.) :—a pretty shrub up to 2 m. tall with clusters of white flowers ; growing in bush formation on coral rock, not common. *Vaughan* 111 (Herb. Mus. Brit.) :—tall shrub with white flowers, growing in shade. Coll. in 1931, *J. H. Vaughan* 1110, 1112, 1437, 1553, 1595 (all in Herb. Kew.).

This is a variable species. The plants I have associated with the type have the twigs glabrous or sparsely puberulous when young, but nearly always glabrous by the time that the coating of bark develops ; in *Hildebrandt* 1177 a slight pubescence persists on the bark-coated twigs, but the specimen is otherwise typical. The mature leaves are also glabrous and narrowed to an obtuse apex. A sparse puberulence is normally present on the upper side of the petioles—in mature as well as

* Both these numbers refer to a single gathering ; they appear in different positions on the same label.

young leaves. Even in the type-group there is considerable variation. The inflorescence may be sessile and the flowers thus in axillary clusters, or there may be a short but distinct peduncle ; both these variations may occur on one and the same plant, as is shown by *Baker* 1104. Variation may also be seen in the length of the pedicels and in flower-size—especially in the length of the corolla tube ; but the extremes are connected by so many intermediates that much importance cannot be attached to these characters. The number of ovules per loculus is inconstant, 2–5 having been counted on different individual placentas. In one flower a trilocular ovary and a trifurcate style was observed. With all these variations the species is, however, usually not difficult to recognise.

var. **acutifolia** *Brenan* var. nov. ; ramulis juventute dense pubescentibus, indumento quam in typo diutius persistente, vetustioribus verruculosis, foliis apice acutis vel subacutis etiam maturitate ad costam praesertim supra pubescentibus, pedicellis inferne ± pubescentibus, ovario subglabro.

Tanganyika Territory. Kilosa, Dec. 1920, *Swynnerton* 1026 (Herb. Mus. Brit.). E. Usambaras : Bombo-Daluni, c. 460 m., 24 Oct. 1935, *P. J. Greenway* 4103 (type of var., Herb. Kew., Herb. Imp. For. Inst., Oxon.) :—a much branched white-flowered evergreen shrub up to 3 m. tall ; local in *Euphorbia*, *Combretum*, *Commiphora*, *Grewia* thicket on red soils. W. Usambaras : Makuyuni Distr., 400–1000m., June 1935, *Koritschoner* 1133 (Herb. Kew.) :—root used for snake-bite treatment : vernacular name (Kisum.) " Mpandua nguku ".

var. **glabrata** (*Oliv.*) *Brenan*, comb. nov.—*Empogona kirkii* Hook.f. var. ? *glabrata* Oliv. in Johnston, The Kilima-njaro Expedition, 341 (1886), *nomen nudum*, et in Trans. Linn. Soc. Bot. ser. 2, **2,** 336 (1887), *cum descr.* ; ramulis persistenter pubescentibus demum glabratis, foliis apice plerumque obtusis vel rotundatis vel nonnunquam etiam leviter emarginatis juventute ad costam pubescentibus vel subtus ubique scabrido-pubescentibus, pedicellis et ovario subglabris vel pubescentibus.

Kenya Colony or Tanganyika Territory ? " 40–60 miles from coast," *H. H. Johnston* (*Kilimanjaro Expedition*) s.n. (type of var., Herb. Kew.).

Kenya Colony. Rabai, 10 Nov., *Rev. W. E. Taylor* 185 (Herb. Mus. Brit.). Mackinnon Road, 1929, *R. M. Graham* 1651 (Herb. Kew. and Herb. Imp. For. Inst., Oxon.) : (on the typed label of this specimen the number S.211 in brackets is also given) :—small shrub to 0·9 m. ; twigs brittle ; buds pinkish ; flowers white ; fairly strong scent. Ukambane, *G. F. Scott Elliot* (*Ruwenzori Expedition* 1893–1894) 2304 (Herb. Kew.).

Scott Elliot (*Ruwenzori Expedition* 1893–1894) 6150 from Sangwa (" common shrub on laterite") is probably this variety. I have not succeeded in finding the precise geographical position of this locality.

Var. *glabrata* may be distinguished from var. *acutifolia* by the different leaf apex and by the more persistent indumentum of the twigs. *Graham* 1651 provides an instructive example of the amount of variation that may occur in a single gathering. The leaves vary from less than 3 to

nearly 6 cm. long and all the variations of apex mentioned in the description may be seen on the same shoot ; the leaves when young may be pubescent all over beneath or the pubescence may be confined to the midrib ; the length of the corolla tube varies between about 4 and 8 mm. I have no doubt, however, that this number all represents the same plant.

var. **taylorii** (*S. Moore*) *Brenan*, stat. nov.—*Empogona taylorii* S. Moore in Journ. Bot. **63,** 145 (1925). *Tricalysia grahamii* Bullock ex [Dale], Trees and Shrubs of Kenya Colony, 143 (1936), *anglice tantum descripta* ; ramulis dense et persistenter pubescentibus demum glabratis, foliis apice obtusis etiam maturitate utrinque sed praesertim subtus dense et breviter pubescentibus subtus mollibus supra scabridis, pedicellis et ovario dense pubescentibus.

Kenya Colony. Giryama*, Oct. 1887, *Rev. W. E. Taylor* s.n. (type of var., Herb. Mus. Brit.) :—used as a cattle medicine in infusion and to increase the supply of milk. Malindi District : Arabuko, Oct. 1929, *R. M. Graham* 2172, B. 698† (Herb. Kew.) :—shrub to 1·2 m., growing in bush ; flowers white or pale pink.

A very distinct variety, to which var. *glabrata* sometimes approaches slightly, but the indumentum on the leaves is never so dense, uniform and persistent as in this plant.

3. **Tricalysia sonderiana** *Hiern* in Oliv. Fl. Trop. Afr. **3,** 119 (1877) ; Bews, Introd. Fl. Natal and Zululand, 198 (1921) ; F. T. Hubbard in Bailey, Stand. Cycl. Hortic. **3,** 3373 (1925)‡ ; Bullock in Kew Bull. 257 (1931) ; Henkel, Woody Plants of Natal and Zululand, 144 (1934).—*Kraussia coriacea* Sond. in Linnaea **23,** 54 (1850) et in Harv. et Sond. Fl. Cap. **3,** 23 (1864–65), non *Tricalysia coriacea* Hiern in Oliv. Fl. Trop. Afr. **3,** 120 (1877).

Portuguese East Africa. Luabo River, 29 May 1858, *Kirk* s.n. (Herb. Kew.). Same locality, 8 Feb. 1861, *Kirk* s.n. (Herb. Kew.). Delagoa Bay, Nov. 1886, *Monteiro* s.n. (Herb. Kew.). Same locality, *Forbes* s.n. (Herb. Kew.). Lourenço Marques, Nov. 1913, *F. A. Rogers* 11809 (Herb. Kew.).

Natal. *Gueinzius* 100 (type, not seen), s.n. (Herb. Kew., Herb. Mus. Brit.). *Gerrard and McKen* 712 (ex Fl. Cap., not seen), s.n. (Herb. Kew.). Coll. in 1852, *Cooper* 1241 (Herb. Kew.). Zululand, *W. T. Gerrard* 1 & 4 (Herb. Mus. Brit.). *W. T. Gerrard* s.n. (Herb. Kew.). Port Natal, *F. B. Grant* s.n. (Herb. Kew.). " Inter frutices pr. Durban ", 30 m., Sept. 1883, *J. M. Wood* 73 (Herb. Mus. Brit.). Inanda, *J. M. Wood* 1091 (Herb. Kew., Herb. Mus. Brit.). Shafton, Howick, spring 1900, *Mrs. Hutton* 68 (Herb. Mus. Brit.). " Dünengebüsche ", Winkle Spruit, Durban, 20 m., 7 Nov. 1911, *H. Rudatis* 1480 (Herb. Kew.) :—flowers white. Doonside, Oct. 1933, *J. Wylie* s.n. (Herb. Kew.) :—flowers white, tinged pink.

British Guiana (cultivated). Botanic Gardens, Georgetown, Dec. 1905, *without collector's name, no.* 8731 (Herb. Kew.). Same locality,

* Giryama is in Kenya, not in Tanganyika Territory as S. Moore (*l.c.*) erroneously stated.

† Both these numbers occur on the same label.

‡ I have not been able to refer to earlier editions of this work.

Dec. 1908, *without collector's name, no.* 8751 (Herb. Kew.). Both previously determined as *T. ovalifolia* Hiern.

The writer has not seen the actual type specimen of this species ; the un-numbered specimens in Herb. Kew. and Herb. Mus. Brit. collected by Gueinzius are, however, very probably isotypes. There is no reason to doubt that the plant represented by the specimens cited above is the true *Kraussia coriacea* Sond., with the descriptions of which there is satisfactory agreement. Though it is unquestionably very close to *T. ovalifolia*, there is seldom any difficulty in recognising *T. sonderiana*, whose variation is comparatively slight. The anthers (including appendages) vary in length from 4 to 5 mm. ; those of *T. ovalifolia* are frequently about 6 mm. long, but may sometimes be as short as 4 mm. The geographical ranges of the two species do not appear to overlap.

4. **Tricalysia junodii** (*Schinz*) *Brenan*, comb. nov.—*Empogona junodii* Schinz in Mém. Herb. Boiss. no. 10, 67 (1900).

Portuguese East Africa. " Delagoa-Bay : forêt de Makorororo, chemin de Khocène ", *Junod* 311 (type, not seen). Lourenço Marques, *J. Borle* 34 (Herb. Kew. ex Nat. Herb. Pretoria).

The position of this among the evergreen species in the key is not certain, as my knowledge of this plant is based only on Schinz's description and Borle's specimen at Kew. The latter is a small fragment and the sheet bears a note that it has been compared with the type. The specimen is in flower and has young leaves towards the ends of the branches ; accompanying the shoot are several evidently mature coriaceous leaves, which are unfortunately all detached, but which apparently belong to the specimen. Schinz also describes the leaves as coriaceous. Now the writer has seen only young leaves on flowering specimens of deciduous species, and the consistency of the mature leaves on fruiting specimens differs from that of the young leaves. The presence of both very young and mature leaves with the Borle specimen suggests that it is indeed evergreen, but certainty over this matter must wait until further material has been seen. As far as can be judged from the exiguous material available, this species is more closely related to *T. allenii* than to the two preceding species and, if truly evergreen, may be regarded as in some degree linking up *T. allenii* and *T. ovalifolia.*

5. **Tricalysia allenii** (*Stapf*) *Brenan*, comb. nov.—*Empogona allenii* Stapf in Kew Bull. 79 (1906).

" Rhodesia. Near the Victoria Falls ", Oct.–Nov., *C. E. F. Allen* 55 (type, Herb. Kew.):—a small shrub, extremely pretty ; the fluffy flowers have the scent of parma violets. No locality is given on the sheet of *Allen* 55 ; I therefore copy that given by Dr. Stapf with the original diagnosis. No note is made of whether it was in Northern or Southern Rhodesia, the R. Zambesi forming, at the Victoria Falls, the boundary between the two territories.

It is unfortunate that, when *Empogona kirkii* and *E. allenii* are united under *Tricalysia*, the former epithet cannot be adopted for the combined species owing to its preoccupation in *Tricalysia.*

The greater range of material of *E. kirkii* now available shows that the supposedly distinguishing characters assigned by Dr. Stapf to *E. allenii*

are not nearly so well marked as was then assumed. In the writer's opinion the last-named species can only be looked upon as a large-flowered variant of *E. kirkii*, if, indeed, further material will not make it desirable for both to be treated as strictly synonymous. Dr. Stapf distinguished his species from *E. kirkii* by the larger, pendulous flowers on much longer pedicels. Now, in material of the latter species, pendulous flowers are shown clearly in *Martin* 428/32, where the corolla is only 7–9 mm. long ; in *Martin* 74/31 the corolla varies in length from 8 to 10 mm., and in other specimens a continuous variation from this size to the small flowers of typical *E. kirkii* is to be observed. There is in the Kew Herbarium an interesting specimen collected on 9 Dec. 1929 near West Nicholson in Southern Rhodesia (*I. B. Pole Evans* 2571) ; it has been at different times determined both as *Empogona allenii* and as *E. kirkii* ; the flowers appear to vary on one and the same shoot from pendulous to horizontal or sub-erect ; the corolla varies in length from 9 to 11·5 mm. and the pedicels from 2 to 6 mm., in fact it effectively bridges the alleged gap between the two " species ". For the present, at least, it appears desirable to maintain typical *E. allenii* as distinct, characterised by its very large corollas about 12 mm. long and its longer pedicels 6–8 mm. long, and to maintain *E. kirkii* as a separate variety.

var. **kirkii** (*Hook.f.*) *Brenan*, stat. nov.—*Empogona kirkii* Hook.f. in Hook. Ic. Pl. t. 1091 (1871) ; Hiern in Oliv. Fl. Trop. Afr. **3,** 115 (1877), non *Tricalysia kirkii* Hiern, *l.c.* 124 (1877). *Hypobathrum kirkii* (Hook.f.) Baill. in Adansonia **12,** 205 (1878).

Nyasaland. Cape Maclear on Lake Nyasa, Oct. 1861, *Kirk* s.n. (type of *Empogona kirkii*, Herb. Kew.).

Northern Rhodesia. Boruma, Jan. 1891, *Menyharth* 1144 (Herb. Kew.). Shrub in dense Mutemwa [no precise locality indicated, but probably from near the Kafue River], *J. D. Martin* 74/31 (Herb. Imp. For. Inst., Oxon.). Riverbank and forest [without precise locality, but probably from near the Kafue River], 1931, *J. D. Martin* 127/31 (Herb. Imp. For. Inst., Oxon.) :—bush 2·4 m. high : vernacular name (Tok.) " Muntokosia ". Shrub in forest [without precise locality], 1931, *J. D. Martin* 143/31 (Herb. Imp. For. Inst., Oxon.) :—vernacular name same as for no. 127/31. In *Isoberlinia globiflora* forest at Ngwesi, 8 Dec. 1932, *J. D. Martin* 428/32 (Herb. Imp. For. Inst., Oxon.) :—shrub to 3 m. high and 1·2 cm. diameter at breast height.

Bechuanaland Protectorate. Chobe District : near Kasinka, in *Combretum* thicket marginal to *Baikiaea* forest, Apr. 1938, *O. B. Miller* B/191 (Herb. Imp. For. Inst., Oxon.).

The excellent series of specimens collected by the late Mr. J. D. Martin show the plant in all stages from bud to fruit, though it must be realised that in the absence of flowers there must be some doubt whether specimens are to be placed under typical *T. allenii* or var. *kirkii*. Of the specimens cited *Martin* 127/31, *Martin* 143/31 and *Miller* B/191 lack flowers. The description of the leaves by Sir J. D. Hooker was made from Kirk's specimen, which is in flower, with the leaves not nearly fully developed. In *Martin* 143/31, which is in fruit, the leaves are chartaceous, ovate-oblong to elliptic-oblong, and those that are apparently mature range in

size from 5·5 to 10·3 cm. long and 3·1 to 5·7 cm. wide. In the typical plant the pedicels and calyx-tube are densely grey-pubescent ; the young leaves are covered by a similar indumentum, but, as the leaves expand, the indumentum becomes more spaced out (although still persistent and dense) and the lower surface of the dried leaves is a pale dull olive-green colour. During the flowering period the pedicels vary in length from about 2 to 5 mm., in fruit they elongate to as much as 12 mm. The length of the corolla-tube varies from about 4 to 6 mm., that of the lobes from about 3 to 5 mm. The specimen collected by Menyharth shows very small flowers, while those collected by Martin have larger flowers, but not only do many intermediates occur but considerable variation in size may be observed in one and the same specimen. The writer has no doubt that these comparatively slight differences should be regarded as falling within the range of intravarietal variation and that they are of insufficient importance and constancy to justify the creation of further taxonomic groups. The larger flowers may be looked upon as forming approaches to typical *T. allenii*.

The fruits of this species do not appear to have yet been described. The following description is based on *Martin* 143/31 and *O. B. Miller* B/191 ; it is important to note, however, that the fruits are possibly not fully ripe :—Fructus pedicello 8–12 mm. longo suffultus, ut videtur bacciformis, subglobosus, circiter 4–6·5 mm. diametro, in statu sicco niger, pilis brevibus patentibus densiuscule conspersis pubescens, lobis calycis persistentibus coronatus, bilocularis ; pericarpium crassiusculum; semina in utroque loculo 2, castanea, subellipsoidea, concavo-convexa, circiter 3–4 mm. longa, 2–3·25 mm. lata, cellulis testae prominentibus obtuse verruculosa.

var. **australis** (*Schweickerdt*) *Brenan*, comb. nov.—*Empogona kirkii* Hook.f. var. *australis* Schweickerdt in Bothalia **3,** 255 (1937); Hutchinson, A Botanist in Southern Africa, 671 (1946).

Transvaal. Zoutpansberg, Nov. 1932, *Obermeyer, Schweickerdt* and *Verdoorn* 72 (type of var., Herb. Kew.) :—small shrub ; flowers white with densely bearded mouth. Lower slopes of Zoutpansberg at Zoutpan, 12 Apr. 1934, *Schweickerdt* and *Verdoorn* 528 (Herb. Kew.).

Very distinct from typical *T. allenii* and var. *kirkii* in the leaves which are glabrous or subglabrous beneath, even in a fairly young state. The pedicels and calyces are also much less hairy than in the type. Schweickerdt describes the leaves of var. *australis* as " multo majoribus " ; although the leaves of the flowering specimens are somewhat larger than in comparable specimens of normal *T. allenii* var. *kirkii* (e.g. the type-specimen), the fully developed leaves on some of Martin's specimens from Northern Rhodesia are considerably larger than any to be seen in those of var. *australis*.

Another specimen, collected at Waterpoort, Zoutpansberg District, 640 m., Sept. 1918 by *F. A. Rogers* (no. 21858, Herb. Kew.), is probably referable to var. *australis*, but has even more glabrescent pedicels and calyces. It is possible that *T. allenii* var. *kirkii* also occurs in the Transvaal ; *Lang* 32285 (Herb. Kew.), from Punda Maria, Zoutpansberg District (16 Nov. 1932), has the pubescence on pedicels and calyx of

typical *T. allenii* and of var. *kirkii*, and the leaves are also rather densely pubescent, although admittedly extremely young ; the pedicels, however, are very short and the buds are curiously short and broad. The variation within the comparatively small amount of material that has been collected in the Transvaal is surprising, and it is to be hoped that botanists in the northern part of that territory will make careful observations on these plants in the field and will collect material exhibiting the various stages of development.

Doubtful Species.

Hypobathrum lagoense *Baill.* in Adansonia **12,** 210 (1878).

Portuguese East Africa. Delagoa Bay, *Forbes* 12 (not seen).

According to Baillon, this is very close to and perhaps a form of *T. ovalifolia*. The style of this plant is said sometimes to lack one of its two apical divisions, so as to be asymmetrically clavate at apex. The writer has not seen this in any of the species dealt with, but the style divisions of *T. allenii* var. *kirkii* may frequently be markedly unequal, and a similar but less pronounced inequality occurs rarely in *T. ovalifolia* and *T. sonderiana*.

The type of *Hypobathrum lagoënse* is said (*l.c.*) to have been issued from the herbarium of " la Société d'horticulture de Londres ". In response to a request made by the writer, the Director of the Royal Horticultural Society's Gardens at Wisley, to whom I am indebted for his courtesy and care in this matter, kindly had the society's Herbarium searched for material of this plant, but without success.

Albert Bruce Jackson.—We much regret to record the death at his home, 3 The Avenue, Kew Gardens, on 14 January 1947, of Mr. A. B. Jackson. Bruce Jackson was well known at Kew in connection with his work on cultivated trees. He was born on 14 February 1876 at Newbury, where he was brought up by his mother. After leaving school he was occupied in journalism till February 1907 when he was appointed to a temporary post in the Herbarium at Kew. Shortly afterwards he became assistant to H. J. Elwes and A. Henry in their work on " The Trees of Great Britain and Ireland," a work whose preparation was centred at Kew. From 1910 to 1932 he was employed as a technical assistant at the Imperial Institute, and from 1932 to the time of his death he worked as a part-time specialist in the Department of Botany, British Museum (Natural History). The knowledge and experience he accumulated while working with Elwes and Henry was turned to good

purpose through his recordings of collections of woody plants at Syon House, Yattenden Court, Albury Park, Westonbirt, and Borde Hill. In 1923, in collaboration with W. Dallimore of Kew, he published " A Handbook of *Coniferae*," which was in process of revision for a third edition at the time of his death. He collaborated with H. Clinton Baker in the writing of " Illustrations of new Conifers," and in 1946 issued " The identification of Conifers " which is essentially keys and illustrations from the larger " Handbook."

Bruce Jackson was of a quiet and kindly temperament, always ready to assist anyone who applied to him for help. He had an excellent knowledge of British flowering plants and mosses and had useful private herbaria of both groups. He will be greatly missed by his many friends on the Kew staff.

W. B. Turrill.

TWO NEW CHASMOPHYTES FROM THE ANTILEBANON.

Peter Hadland Davis

The new species described in this paper were collected during a traverse of the Antilebanon, on foot, from Neb'k to Baalbek in June, 1943, and again, by a somewhat different route, in August, 1945. An account of the earlier journey appeared in the Journal of the Royal Horticultural Society, January, 1944.*

Ajuga chasmophila *P. H. Davis* sp. nov. (Sect. *Chamaepithys* Benth.).

Affinis *A. chiae* Schreb. praesertim *A. chiae* Schreb. var. *latilobae* Boiss., sed habitu robustiore hemispherico villosissimo, laciniis calycis tubo 3–5-plo longioribus distinguitur. Species facie distincta, eximie rupicola.

Perennis, pluricaulis, basi lignosa, saxatilis, habitu hemispherico, aromatica, caulibus foliisque pilis longis patulis et breviter glandulosis molliter villosissimis. *Caules* floriferi simplices, fragiles, ± flexuosi, 5–10 cm. longi, 1 mm. lati, trientibus duobus superioribus vel saltem dimidio superiore racemos densos oblongo-ovatos simplices efformantes, verticillastris bifloris. *Folia* radicalia obovata, in petiolum laminam aequantem attenuata, integra vel 1–3-crenata, evanescentia, caulina spathulato-cuneata aliquantum breviter trilobata vel indivisa, emarcida

* Davis, P. H. " Through the Antilebanon." *Journ. Roy. Hort. Soc.* **69**. 7–13 (1944).

persistentia congesta, floralia late cuneato-attenuata trinervia ad marginem revoluta, 1.5–3 cm. longa, 1–2 cm. lata, ad $\frac{1}{3}$–$\frac{1}{2}$ tripartita lobis obtusis ovato-oblongis 2–5 mm. latis. *Flores* brevipedicellati folia floralia superantes. *Calyx* tenuis, 6–10 mm. longus, patule villosus, laciniis inaequalibus lineari-lanceolatis quam tubo triplo- aut quintuplo- longioribus. *Corolla* magna, sparse hisuta, 2.3–3 cm. longa, calycem circa quadruplo superans, aurea, inferne rubro-striata, tubo manifeste exserto, labio superiore (haud tubo) ad basin fisso, lobo labii inferioris medio superne orbiculari emarginato tubum aequante vel paulo longiore. *Nuculae* transverse corrugatae, 2–3 mm. longae. Floret Mai.-Aug.

Syria. Antilebanon : Falîta above Neb'k, circ. 1800 m., in crevices of vertical cliffs ; perennial herb, hemispherical ; corolla bright yellow with reddish spots, 21.6.1943, *P. H. Davis* 6591 (typus in Herb. Kew.) ; ibid., 10.8.1945, *P. H. Davis* 9911.

Boissier, though fully aware of the polymorphic character of *Ajuga chia* Schreb.; considered *A. vestita* Boiss., *A. bombycina* Boiss. and *A. laevigata* Boiss. to merit specific rank, and Dr. W. B. Turrill in his revision of this group* has followed Boissier's classification. The new species described above is so distinct in general habit from any of the varieties of *A. chia* Schreb. or its closely related species that there seems good reason for giving it specific status. I have related the new Irano-Turanian species to *A. chia* Schreb. var. *latiloba* Boiss., to which, on account of its wide bracts and large flowers, it has the closest taxonomic affinity. Besides its distinct facies, however, *A. chasmophila* has much longer calyx lobes than are usually found in the polymorphic *A. chia* Schreb. The form of the basal leaves (described from a cultivated plant) may also be a distinctive character.

Ecologically *A. chasmophila* is perhaps unique in Sect. *Chamaepithys*, being confined to crevices of vertical cliffs, where it is accompanied by *Hypericum nanum*. Though I have in the Near East frequently found forms of *A. chia* Schreb. in rocky places, I have never observed them on vertical rock—a habitat characterised by distinct and conservative plant communities. It should be noted that *A. chia* Schreb. var. *suffrutescens* Boiss. was collected on the slopes below the cliffs on which the new species was found.

In cultivation *A. chasmophila* retains the taxonomic characters cited in the diagnosis, but is difficult to grow.

Euphorbia promecocarpa *P. H. Davis* sp. nov. (Sect. *Tithymalus* Boiss. §*Esulae* Boiss.).

Ab *E. caudiculosa* Boiss. et *E. bounophila* Boiss. species haec habitu pulvinari, pubescentia, caulibus brevioribus fere ad basin dense foliosis, foliis tenuibus (haud crassiusculis), inflorescentia dichotoma, capsula minore rectangulari-oblonga, forma seminum inter alia differt.

Planta pulvinaris, petrophila, pallide virens, dense vel sparse pubescens, caulibus e rhizomate crasso lignoso numerosissimis tenuibus flexuosis, 3–7 cm. longis, fere ad basin crebre foliosis. *Folia* exstipulata, alterna, subsessilia, integra, 1–4 mm. longa, 0.8–3 mm. lata, infima minima

* Turrill, W. B. " The correlation of morphological variation with distribution in some species of Ajuga." *New Phytol.* **33**, 218–230 (1933).

suborbicularia, superiora obovata ; floralia opposita orbiculari-rhomboidea, mucronulata, 3–6 mm. longa, 2–5 mm. lata. *Inflorescentia* breviter dichotoma, saepe ad cymam 1–3-floram reducta. *Involucrum* turbinatum, circ. 1.5 mm. longum, lobis linguiformibus emarginatis hirtis, glandulis transverse ovato-ellipticis fuscis, cornibus tenuibus latitudinem glandularum aequantibus, bracteolis inter flores masculos plumosis. *Styli* divisi. *Capsula* rectangulari-oblonga, 2–2.5 mm. longa, 1.5 mm. lata, pubescens, trisulcata, laevis, coccis dorso haud alatis. *Semen* pallide griseum, breviter cylindricum, 1.5–2 mm. longum, fere laeve aut superficialissime sparse malleatum, dorso vix carinato, carunculo manifeste subgloboso $\frac{1}{3}$–$\frac{1}{5}$ semen aequante. Floret Mai.-Aug.

Syria. Antilebanon : Falîta above Neb'k, circ. 1800 mm., vertical rocks, 21.6.1943, *P. H. Davis* 6573 (typus in Herb. Kew.) ; Ibid., 10.8.1945, *P. H. Davis* 9907 ; Yebrûd, circ. 1500 m., dry rocks, 10.8.1945, *P. H. Davis* 9897.

The specimens from Yebrûd are less pubescent and have somewhat shorter fruits than those from Falîta.

E. promecocarpa is taxonomically very distinct. Apart from its cushion habit and pubescent indumentum, the unusual shape of its rectangular-oblong capsule at once distinguishes it from *E. caudiculosa* Boiss. and *E. bounophila* Boiss. (from the Lebanon and S. Persia respectively), to which it appears to be most closely related. The seeds are so lightly sculptured as to be almost smooth, in this respect resembling *E. caudiculosa* Boiss. rather than *E. bounophila* Boiss., though the seeds differ from both in their shape and size. To *E. herniariifolia* Willd. the new species seems more distantly related, owing to the winged carpels of the latter's fruit and the deep pitting of its seeds.

E. promecocarpa prefers the driest rocks, being generally accompanied there by *Reutera tenuis*. In arid overhangs it is often the only species found.

I should like to thank Professor Sir William Wright-Smith and Dr. H. R. Fletcher for their advice in the preparation of the diagnoses.

NEW OR NOTEWORTHY PLANTS FROM WEST TROPICAL AFRICA.

A. C. Hoyle and J. P. M. Brenan.
(Imperial Forestry Institute, Oxford.)

Celastraceae.

Campylostemon kennedyi (*Hoyle*) *Hoyle et Brenan*, comb. nov.

Hippocratea kennedyi Hoyle in Kew Bull. 1932, 263.

This species has 5 stamens and conforms in other respects also to the characters of *Campylostemon* Welw. *ex* Benth. & Hook. f. Gen. Pl. **1,** 998 (1862) and as further elucidated by Loesener in Notizbl. Bot. Gart. Berl. **13,** 563–577 (1937), where a key and descriptions of 10 species are given. *C. kennedyi* has leaves intermediate between the size-classes on which Loesener's key is primarily based, suggesting that the size and shape of the leaves is not altogether satisfactory as a primary character for dividing the genus.

The transfer of *Hippocratea kennedyi* to *Campylostemon* makes desirable the publication of a new comparative diagnosis, thus :—a *C. lindequistiano* Loes. et *C. duchesnei* De Wild. et Th. Durand (e descript.) petalis obovato-cuneatis, a *C. laurentii* De Wild. inflorescentiis multo gracilioribus et brevioribus, foliis plerumque angustioribus ellipticis usque obovato-lanceolatis apice magis et acutius acuminatis differt.

A. C. H. & J. P. M. B.

Campylostemon warneckeanum *Loes. ex Fritsch* in Bot. Centralbl. Beih. **11,** 344 (1901).

In correcting a determination of a specimen in the Imperial Forestry Institute Herbarium (*C. Vigne* 2920 from the Gold Coast), which had been named *Hippocratea oliveriana* Hutch. & M. B. Moss, we found that it agreed with the description of *Campylostemon warneckeanum* Loes. ex Fritsch. The specimens quoted by Loesener under the latter species in his revision of *Campylostemon* in Notizbl. Bot. Gart. Berl. **13,** 572 (1937), are *Warnecke* 157 & 302. Fortunately a duplicate of *Warnecke* 302 is deposited in the British Museum Herbarium, and *Vigne* 2920 matches it in all respects.*

This gathering extends the known range of *Campylostemon warneckeanum* Loes., hitherto recorded only from Lome and Bagida in Togoland. The citation of the additional material and notes follows :—

Gold Coast. Ashanti : Jimira Forest Reserve, 275 m., fl. May 1933, *C. Vigne* 2920 (Herb. Imp. For. Inst., Oxon.) :— liane in forest ; small white flowers, turning yellow before falling.

During the investigation described above, we noticed that *Warnecke* 302 was referred in Hutchinson and Dalziel, Fl. W. Trop. Afr. **1,** 450, to

* Duplicates both of the type specimen (Warnecke 157) and of Warnecke 302 are in the Kew Herbarium.—Ed.

Hippocratea oliveriana Hutch. & M. B. Moss. Both the description of *Campylostemon warneckeanum* Loes. and the sheet of *Warnecke* 302 examined in the British Museum Herbarium show that this gathering is not congeneric with *Hippocratea oliveriana*.

The genus *Campylostemon* (placed by Loesener in *Celastraceae* because of its isomerous flowers) was not included in the Flora of West Tropical Africa, so that the above records are additional to that work.

A. C. H. & J. P. M. B.

Anacardiaceae.

Pseudospondias microcarpa (*A. Rich.*) *Engl.* var. **hirsuta** *Brenan*, var. nov. ; folii rhachide petiolulis costa nervisque lateralibus foliolorum praesertim subtus plus minusve hirsuto-pubescentibus differt.

Nigeria. Oyo Prov., Ibadan Distr. : near Oke Eleyele and the Base Hospital, Ibadan, 7 Nov. 1945, *A. P. D. Jones and R. W. J. Keay, Forest Herbarium, Ibadan No.* 13895 (typus varietatis in Herb. Kew. et Herb. Imp. For. Inst., Oxon.) :—tree about 12 m., with wide and low-spreading crown ; bole about 1 m. ; bark grey, slash with green edge, pale cream-straw ; sapwood white ; older branchlets, undersides of leaves and veins with some indumentum ; young leaves brownish-red ; flowers cream-green.

The specimen, which shows branchlets, leaves and ♂ inflorescences, appears to differ from normal *P. microcarpa* only in the remarkable development of indumentum on the vegetative parts. Some hairs are to be seen on the lower surface of the leaflets away from the nerves and also on the margins towards the base.

J. P. M. B.

Pseudospondias longifolia *Engl.* in Engl. Bot. Jahrb. **36,** 218 (1905).

Nigeria. Ogba Reserve, without date, *J. D. Kennedy* 2454 (Herb. Imp. For. Inst., Oxon.).

Distr. Cameroons (*Zenker* 1236, Bipinde). Now recorded for the first time from Nigeria and the area of the Fl. W. Trop. Africa. From *P. microcarpa* (A. Rich.) Engl., the only species of the genus given by Hutchinson and Dalziel, *P. longifolia* is readily distinguished by its trimerous flowers with broader petals.

J. P. M. B.

Caesalpiniaceae.

Brachystegia nigerica *Hoyle et A. P. D. Jones*, sp. nov. (Caesalpiniaceae —Amherstieae); a cognata *B. eurycoma* Harms inflorescentiis et floribus minoribus, petiolo breviore, foliolis pluribus cum fructu multo minoribus, rachidis alis anguste recurvatis neque erectis*, satis distincta.

Arbor alta ; ramuli hornotini tenues, 1–2 mm. diametro, vivi brunnei, teretes, nitiduli, in sicco sulcato-striati, atropurpurei, glabri, interdum

* This valuable diagnostic character is not immediately apparent, but close examination will readily reveal it.

glauci; annotini teretes, purpureo- vel cinereo-brunnei, lenticellis parvis (0.4×0.2 mm.) longitudinaliter ellipticis albido-brunneis prominentibus. Foliorum *alabastra* (minora) 1·5 mm. longa, late ovata, obtusa, compressa, squamis (duabus solis manifestis) valde carinatis pubescentibus ; majora ovoidea, vix compressa, squamis 4–6, castaneo-brunneis striatis ferrugineo-ciliatis (duabus infimis solis pubescentibus carinatisque). *Stipulae* fugaceae (in ramulo uno perjuvenili tantum visae) connatae, intrapetiolares, verisimiliter integerrimae, foliaceae, sine auriculo basali, 10–20 mm. longae, usque ad 9 mm. latae, oblanceolatae, carinatae, minute ciliatae praeterea glabrae, costa et nervis nonnullis lateralibus subtus prominentibus. *Folia* 8–16 cm. longa, 4–7 cm. lata, foliolorum jugis 5–9, plerumque 6–8, fere vel satis contiguis, gradatim apicem versus majoribus ; petiolus 4–7 mm. longus, supra canaliculatus, glaber vel puberulus, dimidio vel ultra pulvinatus, in sicco nigrescens, rugosus ; rachis 4·5–11 cm. longus, 1–1·3 mm. diametro, pilis brevibus crispatis puberulus, supra canaliculatus et inter jugos foliolorum anguste alatus, alis recurvatis*, subtus in vivo teres, in sicco sulcatus, pilis paullum longioribus (quam supra) indutus ; internodiis inter jugos infimos 0·5–1 cm., inter distales 2 cm. longis ; *foliola* supra (costa excepta) glabra vel fere glabra, subtus glabra, supra in statu florescente nitidula, matura opaca ; *foliola basalia* 0·5–2 cm. longa, 0·3–1·2 cm. lata, late elliptica vel oblonga, basi subcordata, apice emarginata, costa paullum obliqua ; *foliola media* 1·5–4 cm. longa, 0·8–2 cm. lata, elliptica vel obovato-oblonga, interdum paullum falcata, basi oblique subcordato-cuneata vel truncata, apice emarginata, costa valde obliqua et excentrica ; *foliola distalia* 2–7·5 cm. longa, 1·5–3·5 cm. lata, oblique obovata, ad basim truncatam vel subcordatam cuneata vel rotundata, apice emarginata vel subacuminato-emarginata, costa paullum curvata et valde excentrica ; omnium costa supra subprominens et puberula, subtus prominens et glabra vel puberula ; nervi laterales angulo semirecto a costa abeuntes et intra marginem arcuati, cum venis reticulatis in statu florescente utrinque prominentes, maturitate subprominentes ; nervi basales citra costam foliolorum basalium 2 (–3), distalium 3–4 (–5), laterales trans costa 7–10. *Inflorescentia* terminalis, breviter pedunculata, subcorymboso-paniculata, congestiflora, 3–4 cm. diametro, axe ramulisque puberulis ; bracteae caducissimae, orbiculares, subcupulares, 1·5 mm. diametro, plus minusve puberulae, margine ferrugineo-ciliatae ; pedicelli 3–5 mm. longi, 0·5–1 mm. crassi, puberuli ; bracteolae 6–7 mm. longae, 4 mm. latae, obovato-ellipticae, extra et in margine dense puberulae, intus glabrae. *Perianthii squamae* 5 (quorum interdum duo vel tres ad medio connatae) inaequales, 2–2·5 mm. longae, 0·75–1 mm. latae, ellipticae, apice subacutae vel irregulariter dentatae vel breviter trifidae, ad margine ciliatae, basi in tubo brevissimo circiter 0·5 mm. longo connatae. *Stamina* 10, basi ultra perianthium brevissime connata, tubo obliquo 0·2–0·4 mm. longo, filamentis 8–10 mm. longis teretibus vel basim versus paullum compressis, antheris suborbicularibus 1·2 mm. longis. *Ovarium* usque ad 3 mm. longum, valvis in medio glabris praeterea ferrugineo-crispato-villosis glabrescentibus, stipite 3 mm. longo prope apicem sparse villoso, stylo 9–10 mm. longo, in triente inferiore

* This valuable diagnostic character is not immediately apparent, but close examination will readily reveal it.

sparse villoso. *Legumen* 9–14 (interdum ad 17) cm. longum, 3·5–4 cm. latum, late oblongo-naviculiforme, crasse coriaceum, extra leve, nitidulum, atropurpureum vel atrobrunneum, lenticellis minutis perinconspicuis, intus subfusco-brunneum, angulo recto ad stipitem tenuiusculum 6 mm. longum, 2–2·5 mm. diametro adjunctum; sutura superiora utrinque alata, alis oblique ascendentibus (vel patentibus?) 2–3 mm. latis; rostrum (praefracto solo viso) verisimiliter parvum. *Semina* complanata, orbicularia, 1·5–2 cm. diametro, verisimiliter atropurpurea, nitida.

Nigeria. Onitsha Province: Awka, in C.M.S. Compound, flowers and one leaf (spirit material only) 2 Jan. 1945, *Rev. K. H. Prior* s.n. (type of flowers, divided between Kew and Herb. Imp. For. Inst., Oxon.); same locality, leaves only, 3 June 1942, *A. P. D. Jones*, *Forest Herb.*, *Ibadan No.* 6609 (Herb. Imp. For. Inst., Oxon. ex Ibadan); Onitsha Province, without precise locality or date, *D. F. Chesters* " d " (of A 124/30) (Herb. Kew., Herb. Imp. For. Inst., Oxon.); Onitsha (town?) old and very young leaves, 3 Sept. 1909, *A. H. Unwin* 66 (Herb. Kew.). Ogoja Province: Ikom Division, 2 miles south of Ekosoro in small stream-valley, tributary of Cross River, old leaves only, 27 April 1942, *A. P. D. Jones*, *Forest Herb.*, *Ibadan No.* 6484 (Forest Herb., Ibadan). Benin Province (?): Ubiaroko, near Kwale, young inflorescences and leaves, and old fruits, Dec. 1932, *J. R. Ainslie* 15 (Herb. Kew., Herb. Imp. For. Inst., Oxon., Forest Herb., Ibadan). Ondo Province (?): in broken forest near U.A.C. road-trace north of Oluwa Reserve and about 5 miles north of the Shasha Reserve boundary, old leaves, fruit from ground, 10 Feb. 1946, *A. P. D. Jones* and *C. F. Onochie*, *Forest Herb.*, *Ibadan No.* 14732 (Herb. Imp. For. Inst., Oxon. ex Ibadan). Without locality or date, old leaves and fruits, *J. D. Kennedy* 1842, type of fruits (divided between Kew and Herb. Imp. For. Inst., Oxon.).

Note. *Prior* s.n. (the type) and *Jones*, *F. H. I. No.* 6609, were collected from trees in the same compound, but whether from the same individual is not known.

Field Notes.

Tree 18 m. high, young leaves yellowish-brown; on red acid sands at edge of relic forest patch (*A. P. D. Jones*, *F. H. I. No.* 6609). Young tree 15–18 m. high and 68 cm. diameter; bark smooth, light grey, with a few raised, transverse rings; inner bark when cut pinkish, with lighter streaks, darkening in a few minutes to a rich brown, fragrant; sapwood white; in small stream valley in rather open, degraded high forest, with *Elaeis guineënsis*, *Ricinodendron africanum* and *Pterocarpus sp.* (*A. P. D. Jones*, *F. H. I. No.* 6484). Tall tree about 27 m. by 1·8 m. girth (*Jones* & *Onochie*, *F. H. I. No.* 14732).

Large tree up to about 36 m. by 3·6 m. girth; bark of old trees rather rough, scaling in large irregular plates; locally common throughout S. Nigeria (Oyo, Ondo, Benin, Onitsha, Owerri and Ogoja Provinces), often gregarious and forming small patches on the moister sites in high forest; very common in the wet forests in Shasha Reserve and not confined to stream banks, although common in riverain high forest; seedlings and suckers have 3–4 pairs of leaflets with the apical pair very large; young trees up to 15–18 m. have usually 5–6 pairs of leaflets with the apical pair still obviously the largest; large mature trees have usually 8–9 pairs of

leaflets with the apical pair broader and more obovate but only a little longer than the next pair below. (A. P. D. Jones, notes from general observation).

Vernacular name (Ibo): ACHI (*Unwin* 66).

Note. The name ACHI is used for all species of *Brachystegia* throughout the Ibo country (A. P. D. Jones).

A. C. H.

ROSACEAE.

Acioa johnstonei *Hoyle, descr. ampl.*

This species was originally described in Kew Bull. 1932, No. 6, 258, from a flowering specimen, *A. T. Johnstone* J 74/31, collected at Bum, Bamenda District, British Cameroons, in January 1931 and deposited at Kew and Oxford. The fruiting stage of the same species, collected in the same district by *T. D. Maitland* (No. 1401) in June of the same year, has now been made available through the energy and by the courtesy of the late Mr. A. P. D. Jones, Curator of the Forest Herbarium, Ibadan, Nigeria. Part of the Ibadan specimen of *Maitland* 1401 is now deposited in the Imperial Forestry Institute Herbarium, Oxford. There is also a duplicate of the type specimen at Ibadan. The following amplification of the specific description appears desirable :—

Branchlets with age becoming rough with prominent, circular lenticels. *Leaves* up to 11·5 cm. long. *Fruiting inflorescence-axis* up to about 10 cm. long, the spreading pilosity persistent ; fruiting pedicels 2–3 cm. long, stout, increasing in diameter from 1·5 mm. near the base to 2·5 mm. near the thickened apex, shortly pubescent and also sparsely pilose with long spreading hairs, ebracteate or with the glandular-ciliate bracts still persistent ; one or more petals and the indurated staminal sheath sometimes persistent below the fruit ; stipe of the fruit very short and stout, 2 mm. long, 4 mm. thick. *Fruit* 2–3·5 cm. long, 2–3 cm. broad, ovoid, very broadly rounded at the base, rounded or obtuse at the apex, covered with a very dense, short, velvety, pale brownish-olive tomentum mixed with longer setose hairs, the surface beneath blackish-purple, somewhat rugose and with scattered, sub-prominent, smooth tubercles or lenticels ; epicarp thin, coriaceous, brittle when dry, separating with difficulty from the reddish-brown, rather fibrous, lamellate mesocarp, the two together 1 mm. thick ; endocarp 1 mm. thick, pale reddish-brown, separating easily from the mesocarp, the inner surface glabrous, marked with fine, anastomosing striae. *Seed* firmly fleshy, ovoid, up to 2·6 cm. long and 1·6 cm. broad when dry, blackish-purple, longitudinally wrinkled, striate like the inner surface of the endocarp by the pressure of the covering of long, stiff, appressed, downwardly directed, brownish-yellow, setose hairs.

BRITISH CAMEROONS. Bamenda District, Forfuka (or Fonfuka ?), 1220 m., fruit June 1931, *T. D. Maitland* 1401 (type of fruit, Herb. Imp. For. Inst., Oxon., Forest Herb., Ibadan, Nigeria). A small tree or shrub on edge of forest.

A. C. H.

RUBIACEAE.

Tricalysia discolor *Brenan*, sp. nov. ; *T. macrophyllae* K. Schum. affinis, ramulis primo juventute glabris nec adpresse puberulis, stipularum vaginis brevioribus intus glabris nec sericeis acuminibus multo brevioribus glaberrimis, venis inter nervos laterales foliorum transversis magis irregularibus et multo inter sese distantioribus, venulis ultimis in areolis retis venarum subtus plus minusve occultis nec elevato-prominentibus, calyce marginibus loborum ciliolatis exceptis glabro, ovarii loculis biovulatis distat ; praeterea ob endospermium ruminatum in genere ut videtur egregia.

Arbor parva vel mediocris, 6–9 m. alta, trunco 60–90 cm. circumferentia. *Ramuli* validi, ut videtur glabri sed pilis minutissimis nonnisi microscopice cernendis sparse vestiti, laeves, griseo-brunnei, novelli siccitate plus minusve bisulcati, serius subteretes vel obtuse subangulati, 2·75–6 mm. diametro, internodiis circiter 2·5–8 cm. longis. *Folia* petiolata, petiolo 0·7–1·5 cm. longo supra sulcato subtus rotundato more ramulorum vestito ; lamina firme chartacea vel subcoriacea, oblonga usque oblongo-lanceolata, apice acute acuminata acumine circiter 0·5–1·5 cm. longo, basi acute cuneata et in petiolum attenuata, 13–26 cm. longa, 3·8–9 cm. lata, supra glabra siccitate atro-brunnea vel nonnunquam brunnea, subtus pallidiora et grisea vel olivacea vel pallide brunnea, in costa et nervis lateralibus minutissime puberula (sub lente valido visa), aliter glabra, costa et nervis lateralibus utrinsecus 8–11 supra anguste canaliculato-impressis subtus prominentibus et plus minusve atropurpureis vel griseo-purpureis, venis traversis supra subtusque prominulis ; stipulae in vaginam 2–4 mm. longam extra more ramulorum vestitam intus glabram subtruncatam acuminibus duobus 1–3 mm. longis coronatam cohaerentes. *Inflorescentiae* paululo supraäxillares, subsessiles, cymosae, multiflorae, congestae, circiter 1·5–2 cm. longae ; bracteolae inferiores cupulatim connatae, biapiculatae. *Flores* pentameri, albi, subsessiles vel brevissime pedicellati, pedicellis usque ad 2 mm. longis glabris ; bracteolae ultimae basim pedicelli versus insertae, oppositae vel subopposite vel alternatae, anguste ovatae, circiter 1·5–2 mm. longae, haud connatae. *Calyx* (receptaculo incluso) campanulatus, 3 mm. longus, apice 2·5–2·75 mm. diametro, extra glaber, tubo 2 mm. longo, lobis 5 triangularibus 1 mm. longis basi 1–1·2 mm latis apice acutis vel subacutis margine ciliolatis intus glabris. *Corollae tubus* 7 mm. longus, basi 1·5–2 mm. diametro, sursum ampliatus, hinc apice circiter 3·5–4 mm. diametro, extra glaber, intus fauce et parte ampliata dense longeque villoso-barbata, inferne glabrescens ; lobi 5 reflexi ovato-oblongi, 4·5 mm. longi, 2·5–3 mm. lati, glabri, apice oblique et breviter bidentati. *Stamina* 5, fauce inserta, filamentis 3·5–4 mm. longis deorsum parce villosis ; antherae exsertae, dorsifixae, oblongo-ellipticae, 2·5–2·75 mm. longae, apice saepe minute appendiculatae. *Ovarium* biloculare, ovulis in utroque loculo 2 in placenta carnosa immersis. *Stylus* 7·5 mm. longus, gracilis, glaber, apice bifurcatus, lobis inaequalibus 1·75–2·5 mm. longis. *Fructus* pedicellis circiter 4–9 mm. longis bracteolis persistentibus suffulti, globosi vel ovoideo-subglobosi, glabri, circiter 4–6·5 mm. diametro, calyce persistenti coronati. *Semina* in quoque loculo 1, subpyramidalia, unilateraliter applanata, 4 mm. longa, 3·5 mm. lata, medio 2 mm. crassa, endospermio profunde ruminato, hinc testa fissuris angustis praedita.

Gold Coast. Bonsu, Mar. 1926, *Mrs. R. Burnett* 73 (Herb. Imp. For. Inst., Oxon.) :—tree : vernacular name " Pi ". Begoro-Bosusu, 300 m., July 1927, *Mrs. Moor* 90 (*Gold Coast Forest Herb. No.* 329) (Herb. Kew., Herb. Imp. For. Inst., Oxon.) :—tree 9 m. high. Agyikwansu, May 1931, *S. T. Jackson junior* 2247 (Herb. Imp. For. Inst., Oxon.) :— tree about 7·5 m. high and 0·6 m. in girth ; fruits in bunches along the branches. Southern Scarp Reserve, Plot C, 420 m., July 1931, *H. W. Moor* 261 (*Gold Coast Forest Herb. No.* 2349) (Herb. Imp. For. Inst., Oxon.) :— tree 6 m. high ; young fruits in axillary clusters. Mampong Scarp, 490 m., Feb. 1933, *C. Vigne* 2748 (typus in Herb. Kew.) :—small tree 6 m. high, 0·9 m. in girth, with spreading crown, growing in secondary growth in closed forest ; flowers small, white, in axillary inflorescences. In farm, Juaso, 26 Feb. 1935, *G. K. Akpabla* 282 (Herb. Imp. For. Inst., Oxon.) :—a straight-growing tree up to 6 m. high ; flowers in axils of leaves. Ampunyase, Aug. 1936, *J. E. Andoh* 4240 (Herb. Imp. For. Inst., Oxon.) :—medium-sized tree with squared stem 0·6 m. in girth and 6 m. high : vernacular name (Ash.) " Akokurajchin ".

The particular combination of characters shown by this plant is a perplexing one and indicates how unsatisfactory are certain of the criteria used for distinguishing genera in the *Rubiaceae* ; it is not without much hesitation that I have described this plant as a *Tricalysia* rather than separated it generically. In all its features it appears to be a typical *Tricalysia* except for the important and anomalous fact that its endosperm is markedly ruminate. This distinction elsewhere in the family has usually been considered sufficient to justify a separate genus, but *T. discolor* is in my opinion so very obviously and closely related to *T. macrophylla* K. Schum., whose endosperm is not ruminate,—apparently more closely related indeed than *T. macrophylla* is to many of its other congeners—that to place the pair in different genera would surely be unnatural. I am therefore unwilling, especially as the fruits of a number of *Tricalysia* species are yet unknown, to create an additional artificial genus which would lack facies and whose solitary diagnostic character would be observable only by an examination of ripe seeds. When a much needed revision of *Tricalysia* is made, it may be possible to split the genus more naturally, but this may more properly be left to the monographer.

The ruminate endosperm of *T. discolor* suggests comparison with the genus *Galiniera* Del., but the new species differs clearly in the longer corolla tube, in the glabrous, subfiliform style-branches which are neither dilated nor shortly hairy outside, and in having the ovules immersed in the placenta.

It is convenient here to deal with a nomenclatural matter affecting *Tricalysia macrophylla*. The name *Tricalysia pluriovulata* K. Schum. ex Hoyle in Check-lists For. Trees & Shrubs Brit. Emp., No. **3** (Draft of Gold Coast Check-list), 119 (1937) has unfortunately crept into literature. *T. pluriovulata* K. Schum. was an unpublished manuscript name applied to *Zenker* 1569, from the Cameroons, one of the two type-numbers of *T. macrophylla* K. Schum. in Engl. Bot. Jahrb. **28,** 66 (1899). The Gold Coast specimen, *Beveridge* 2943, cited by Hoyle (*l.c.*), is conspecific with *T. macrophylla*, under which *T. pluriovulata* should therefore fall into synonymy.

J. P. M. B.

HOPLESTIGMATACEAE.

Hoplestigma klaineanum *Pierre* in Bull. Soc. Linn. Par., n.s. No. 14, 116 (1899).

NIGERIA. Without collector's name or precise locality but probably from Oban District, *Forest Herb., Ibadan No.* 987 (Herb. Imp. For. Inst., Oxon.).

Distr. Gaboon. Now recorded from Nigeria and the area of the Fl. W. Trop. Afr. for the first time. The specimen cited above is only in fruit, but agrees well with *Klaine* 2043 from the Gaboon. There are only two species known of this very remarkable genus, the one mentioned above and *H. pierreanum* Gilg from the Cameroons.

J. P. M. B.

APOCYNACEAE.

Alafia grandis *Stapf* in Thiselton-Dyer, Fl. Trop. Afr. **4** sect. 1, 196 (1902).

NIGERIA. Ogoja Province, Ikom District : Ikom, 21 Feb. 1943, *T. F. Betts, Forest Herb., Ibadan No.* 6905 (Herb. Imp. For. Inst., Oxon.) :— climber (sent with rubber specimen).

Distr. Cameroons. The above is a new record for Nigeria and the area of the Fl. W. Trop. Africa. A striking species with leaves remarkably large for the genus. The flowers of the Nigerian specimen are very mouldy and it is poor, but sufficient to leave no doubt of its identity with *Alafia grandis*, with the type-specimens of which at Kew, collected by Zenker and Staudt, it agrees well.

J. P. M. B.

A NEW SPECIES OF CAREX.

E. NELMES

Carex coriogyne *Nelmes*, sp. nov.; affinis *C. muricatae* L., sed spicis paucioribus, squamis multo longioribus ovato-lanceolatis, utriculis latioribus ovato-ellipticis, praecipue differt.

Rhizoma caespitosum. *Culmi* 25–40 cm. alti, stricti, triquetri, sursum scabri, ad basin vaginis fuscis dissolutis obtecti. *Folia* culmo breviora, 2–3 mm. lata, plana, pallide viridia, inferiora interdum recurva. *Spicae* 3–4, androgynaeceae, pauciflorae, contiguae vel subdistantes, simplices, subebracteatae, inflorescentiam oblongam 2–2.5 cm. longam formantes. *Squamae femineae* 4–4.5 mm. longae, 1.8–2 mm. latae, ovato-lanceolatae, apice acutae vel subacutae, carinatae, mucronulatae, albido-brunneae. *Utriculi* 4.5–5 mm. longi, 2.75–3 mm. lati, late ovato-elliptici, plano-convexi, demum squarrosi, glabri, nitidi, pallide virides, dorso paucinerves, ventre enerves, marginati, marginibus superne scabri, in rostrum latum circiter 0.75 mm. longum scabrum bidentatum (dentibus strictis tenuissimis 0.5 mm. longis) abrupte contracti. *Nux* circiter 3 mm. longa et 2.5 mm. lata, ovato-orbiculata. *Stigmata* 2.

TURKEY. Lydia ; Smyrna, Mt. Takhtali, 26 May 1906, *Bornmüller* 10,106.

ON THE RELATIONSHIPS OF LANNEA BARTERI (*OLIV.*) *ENGL.*

A. C. Hoyle and the late A. P. D. Jones.

The type specimen of *Lannea barteri* (Oliv.) Engl. (*Odina barteri* Oliv.), Nupe, *Barter* 1109, in the Kew Herbarium, consists of two sheets, on one of which are mounted somewhat immature, detached leaves and part of a branchlet with inflorescences and a leaf-bud but without developed leaves, and on the other a fascicle of inflorescences and a single detached leaf. The indumentum on the very young leaves of the leaf-bud and on the inflorescences (on both sheets) is a characteristic, floccose, pale salmon-coloured or brownish tomentum entirely composed of long-armed, crispate-stellate hairs. On the other hand, the detached leaves (on both sheets) are pubescent on the upper surface and densely pubescent on the lower surface, with simple erect or spreading hairs among which a few, relatively short-armed, stellate hairs are scattered. The difference between these two kinds of indumentum is striking, and it is surprising that hitherto no doubts seem to have been expressed about the homogeneity of the type.

During an expedition to the Anglo-Egyptian Sudan (1938-39) one of us (A.C.H.) had abundant opportunity to study the dry-zone species of *Lannea* in country whose vegetation is very similar to that of much of Northern Nigeria where Barter collected his material. Two species of this genus occur commonly in the extensive savanna woodland on the " ironstone " soils of the south-western Sudan, especially in the area, familiar under the name of " Djur-land," where Schweinfurth collected. These two species were readily distinguished from a considerable distance in the field by characters of the bark and habit (which are described in detail in the citation of notes below and illustrated in Plates 1 and 2); they were at the time given the provisional appellations "*Lannea* No. 1" (with dark, rough bark) and " *Lannea* No. 2 " (with light grey bark showing a spiral twist). These trees occur separately or together, but were nowhere seen in flower at the same time and place, "*Lannea* No. 1" opening its flowers some ten days to a fortnight earlier than the other under the same conditions. It was found impossible to collect inflorescences and fully-developed leaves from the same individual tree at the same time, because both species flower when the leaves are still in the bud or only partially developed. Hundreds of trees were seen, and there was considerable variation from place to place in the flowering-time of both species.

Careful collections were made from both species on several occasions, full notes were made, and the trees were photographed separately and together. When the leaves and inflorescences, thus reliably correlated, were compared with *Odina barteri* Oliv., it was found that the indumentum of the leaf-buds on the branchlet of *Barter* 1109, already referred to, agreed with " *Lannea* No. 1," while the indumentum of the detached leaves agreed with " *Lannea* No. 2." There is therefore no doubt that the type of *Odina barteri* is a mixture, and that the detached leaves were taken from an individual plant belonging to a different species from that which

furnished the flowering branchlet. There is no evidence that Oliver suspected a mixture when he described *Odina barteri* in the Flora of Tropical Africa **1,** 446–7 (1868), and it is clear that the description was drawn up from the two specific elements composing the type cited by him. The description is not based predominantly on either of these elements.

It has already been explained that the two species frequently occur together in the Sudan, and may be expected to do so in similar country elsewhere. The mixture described above is therefore not very surprising, especially as it occurred in the early days of collecting in Africa, when correlation of material was not always precise. The different flowering-times and the fact that both species flower when leafless or with only very young leaves, would tend to make the collection of such a mixture or the subsequent mixing of specimens even more likely. What is more surprising is that in comparatively recent times, mixtures of these two species have repeatedly been made. Sometimes the branchlets and inflorescences of "*Lannea* No. 1" have been mixed, following Barter's example, with the leaves of "*Lannea* No. 2," or branchlets and inflorescences of both species have been mounted together. In other cases the branchlets and inflorescences of "*Lannea* No. 2" have been mixed with the leaves of "*Lannea* No. 1."

In view of the fact that *Odina barteri* was based on a mixed specimen and that the subsequent interpretation of this species has been similarly confused (probably due in part to the original mixture), we propose that *Lannea barteri* (Oliv.) Engl. (*Odina barteri* Oliv.) be rejected as a *nomen confusum* under Article 64 of the International Rules.

The identity of the two specific elements composing the mixture will now be considered.

The branchlet and inflorescences of *Barter* 1109 and eight specimens of "*Lannea* No. 1" collected by Hoyle from eight separate trees in various parts of the Sudan, all agree with the description of *Lannea schimperi* (Hochst. ex A. Rich.) Engl. (*Odina schimperi* Hochst. ex A. Rich. Tent. Flor. Abyss. **1,** 140 : 1847), and with *Schimper* 657 and 1282, quoted by Richard, duplicates of which are deposited in the Kew, British Museum and Fielding (Oxford) Herbaria. *Lannea schimperi* is an addition to Hutchinson and Dalziel's Flora of West Tropical Africa ; citations of specimens seen are given at the end of this paper. It has further come to our notice that *Lannea stolzii* Engl. et v. Brehm., of which isotypes (*Stolz* 1570, 1603 and 1638) are deposited in the Kew and Oxford (Imperial Forestry Institute) Herbaria, is conspecific with *L. schimperi*.

The correct identity of "*Lannea* No. 1" (= the flowers of *Lannea barteri*) having thus been established, there remained the problem of identifying "*Lannea* No. 2" (= the leaves of *Lannea barteri*). The leaves of *Barter* 1109 and three specimens of "*Lannea* No. 2" collected by Hoyle from three separate trees in the Sudan, were found to agree excellently with *Lannea kerstingii* as described by Engler and Krause (Engl. Jahrb. **46,** 325 : 1912) on the basis of two specimens, *Kersting* 68a from Sokode in Togo and *Chevalier* 521 from "Onassaïn"* in French Sudan. Comparison with

* See footnote below citation, p. 83.

L. schimperi (Photo S.261 of *Hoyle* no. 585).

L. schimperi (left) and *L. kerstingii* (right)
(Photo S.259; tree on right is *Hoyle* no. 586).
Habit of two species of *Lannea*. *Photos*—A. C. Hoyle.

To face page 77.]

L. schimperi (Photo S.263 of *Hoyle* no 585).

L. kerstingii (Photo S.262 of *Hoyle* no. 586).

Bole and bark of two species of *Lannea*.

Photos A. C. Hoyle.

Kersting 68a was at the time (1945) impossible, and unless a duplicate was distributed from Berlin, this gathering is probably now lost for ever. By the courtesy of the Director of the Muséum Nationale d'Histoire Naturelle in Paris, and the collaboration of Professor F. Pellegrin, we were able to have a specimen compared for us with *Chevalier* 521. Professor Pellegrin, to whom we sent leaflets of " *Lannea* No. 2 " (under the name of *L. barteri*) and of *Lannea velutina* A. Rich. (the only other species with which, so far as we know, the leaf-indumentum can be confused), writes as follows :— " *Lannea* : Le No. 521 de Chevalier, type du *L. Kerstingii* de la main d'Engler est sans aucun doute un *L. Barteri*. Quant au No. 9753 Chevalier, type du *L. sessili-foliolata*, c'est un échantillon très insuffisant, en feuilles seulement, et donc les folioles ont exactement l'indumentum du *L. Barteri*, lui aussi. Rien de commun avec le *L. velutina*." This determination not only establishes that " *Lannea* No. 2 " and the leaves of *L. barteri* are both conspecific with *L. kerstingii* Engl. and Krause, but also disposes of the inadequately-known *L. sessilifoliolata* Engl.

Description and Identification of Mixed Material.

1. In Kew Herbarium.

Nigeria : Nupe, *Barter* 1109. Sheet 1 : flowering branchlet = *L. schimperi* ; foliage = *L. kerstingii*. Sheet 2 : detached fascicle of inflorescences = *L. schimperi* ; foliage = *L. kerstingii*.

Nigeria : Katagum District, *Dalziel* 225. Sheet 1 : several short branchlets bearing fruiting and aborted inflorescences = *L. schimperi*. Sheet 2 : one short piece of branchlet bearing inflorescences = *L. kerstingii* ; foliage = *L. kerstingii*.

Nigeria : Agaie, *Yates* 61. One sheet only : one detached fascicle of inflorescences = *L. kerstingii* ; one branchlet with broken leaf-rhachides and two detached leaves = *L. schimperi*.

Nigeria : Bauchi Plateau, *Lely* P.159. One sheet only : two branchlets with male and female inflorescences respectively = *L. schimperi* ; detached leaflets = *L. kerstingii*.

Note.—This number (*Lely* P.159) in Lely's own Herbarium in the Imperial Forestry Institute Herbarium, has on one sheet two branchlets bearing respectively male and female inflorescences = *L. schimperi*, and one detached leaf =*L. schimperi*.

2. In the British Museum Herbarium.

Uganda : Unyoro, near Masinde, *Bagshawe* 880. Sheet 1 : leaves and flowers = *L. schimperi*. Sheet 2 : leaves and fruits = *L. kerstingii*. Both sheets are dated January.

3. In Lely's Herbarium in the Imperial Forestry Institute Herbarium, Oxford.

Nigeria : Bauchi Plateau, *Lely* P.158. One sheet only : one branchlet with female inflorescences = *L. schimperi* ; one detached leaf = *L. schimperi*; three branchlets bearing female inflorescences, from bud-stage to young fruiting stage = *L. kerstingii*.

It is clear that in some cases these mixtures have occurred because the collector gathered his material from more than one tree, and communicated the whole under one number. In other cases it seems more probable that the origin of the mixture is to be sought in mounting. The latter was almost certainly the cause with *Dalziel* 225, where only two detached inflorescences of *L. schimperi* were mounted on a sheet otherwise unmixed *L. kerstingii*, while *Dalziel* 186 is also unmixed.

The relationship between *L. schimperi*, *L. kerstingii* and *L. velutina* will now be considered in greater detail. With the large amount of material now available for study, it is possible to devise a practical key to the fruits and to the leaves independently. Either of these keys can be used with some confidence to distinguish the three species from the young fruiting stage until the leaves fall. The shape and number of leaflets are too variable to be reliably used as diagnostic characters, and are therefore omitted.

KEY USING MATURE FRUITS AND BARK ONLY. (*See* Plates 2 and 3).

Fruit more or less densely velutinous with simple hairs, with or without a few scattered stellate hairs ..... *L. velutina*

Fruit glabrous:

Fruit obliquely or irregularly ovoid or suborbicular, smooth when fresh, markedly rugose when dry, 7–9 mm. in diameter; fruit-stalk 2 mm. long or less, jointed above the middle, so that the detached fruit is very shortly stalked ; bark rough, dark grey or black ..... *L. schimperi*

Fruit ovoid-oblong, laterally flattened, especially toward the apex, 9–13 × 7–8 mm., regular or with the apex rather obliquely truncate, smooth (not rugose) when dry, brown with a glaucous bloom ; fruit-stalk 4–5 mm. long; bark relatively smooth, light grey, usually spirally grooved.... *L. kerstingii*

KEY USING LEAVES ONLY (at fruiting stage or older; *see* Plate 4).

Indumentum of leaflets floccose, pinkish, salmon-coloured or reddish-ferruginous, composed of long-armed, weak, crispate-stellate hairs only, which are early caducous and have largely disappeared from the upper surface in the mature fruiting stage, but remain densely matted beneath, concealing the lower surface ..... *L. schimperi*

Indumentum of leaflets velutinous, persistent on both surfaces, greenish brown or grey to whitish yellow or tawny, composed of simple hairs and stiff, non-crispate, short-armed, stellate hairs :

Margin of leaflets stellate-tomentose, with fewer simple hairs intermingled but inconspicuous; lower surface closely and prominently areolate, densely velutinous, with long, whitish, simple hairs spreading from the veins, filling the areolae and concealing the surface ; tawny stellate hairs conspicuous among the short simple hairs on the upper

L. velutina.
(*C. Vigne* no. 3788).

L. kerstingii.
(*Hoyle* no. 682).

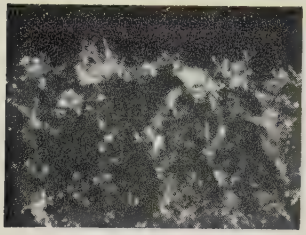
L. schimperi.
(*J. Smith* no. 12).

Dried fruits of three species of *Lannea*, × 4.

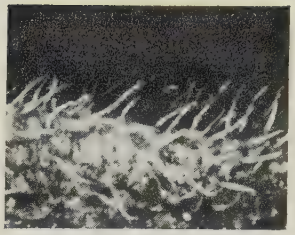
Photos—L. Clinkard.

[*To face page* 78.

PLATE 4

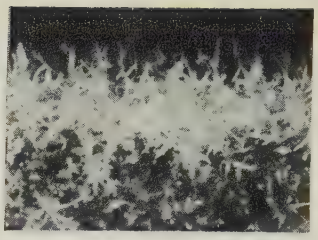


A1

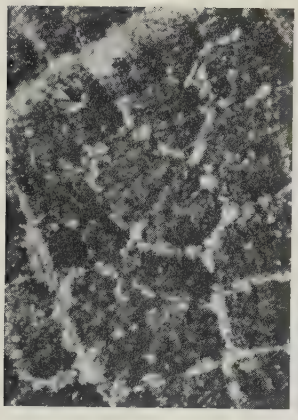


B1

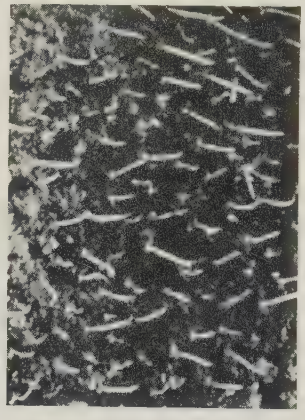
Part of margin seen from above.



C1

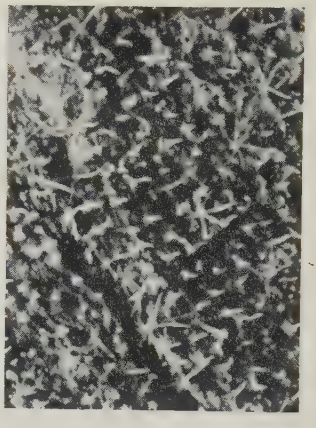


A2

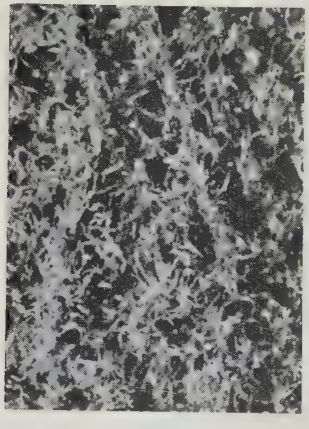


B2

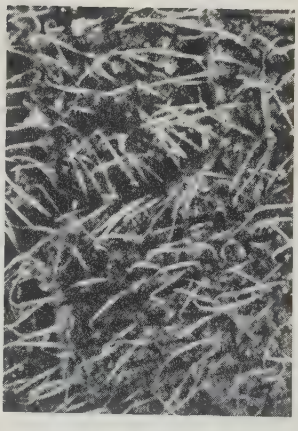
Part of upper surface.



C2

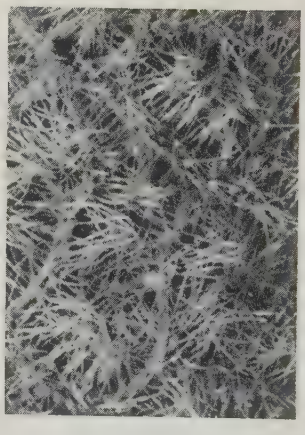


A3



B3

Part of lower surface.



C3

A—*L. schimperi* (*J. Smith* 12).

B—*L. kerstingii* (*C. Vigne* 3915).

C—*L. velutina* (*C. Vigne* 3788).

Leaf-indumentum of three species of *Lannea*. × 20.

To face page 79.

Photos—L. Clinkard.

surface, on the veins on the lower surface, and especially on the margin ..... *L. velutina**

Margin of leaflets ciliate with rather long simple hairs and a very few stellate hairs; lower surface openly and not prominently reticulate, the surface easily visible between the erect and spreading simple hairs; tawny stellate hairs few and inconspicuous on both surfaces and on the margin *L. kerstingii**

The leafless flowering or sterile branchlets of *L. schimperi* can be distinguished from those of the other two species by having, on the leaf-buds and inflorescences, the pinkish or reddish-ferruginous indumentum of long-armed, shaggy stellate hairs only. The female inflorescences of *L. velutina* may be distinguished from the female inflorescences of *L. kerstingii* by the tomentose ovary in the former, the ovary of the latter being quite glabrous. The male inflorescences of these last two species cannot be reliably distinguished except by very careful comparison with authentically-named flowering specimens having leaves of sufficient age attached or reliably correlated. It is evident that the differences between *L. velutina* and *L. kerstingii* are less important and less fundamental than those which distinguish both these species from *L. schimperi*. It is also known from numerous field notes (below) that the bark and habit of *L. schimperi* and *L. kerstingii* are strikingly different (Plates 1 and 2). Unfortunately, none of the eight collectors of *L. velutina*, whose specimens have been examined, has furnished any information of diagnostic value about the habit of this species, and none has even mentioned the bark.

The distribution of the three species is interesting. *L. velutina* seems to be confined to a comparatively small part of West Tropical Africa, having been collected, as far as known, only from Senegal, the Gambia, French Sudan, Portuguese Guinea and northern Gold Coast. *L. kerstingii* has been collected from French Sudan, the Ivory Coast, the Gold Coast, Togoland, Nigeria, northern Cameroons, the Anglo-Egyptian Sudan and Uganda, but does not seem to spread further east or south. *L. schimperi* occurs in Senegal, and ranges from Nigeria and the Cameroons through the Ubangui-Shari-Chad, the Anglo-Egyptian Sudan, Abyssinia, Uganda and Kenya to Tanganyika Territory. It appears to extend further into parts of Nyasaland and Northern Rhodesia. Here, however, it comes into the area of distribution of the closely-related South African species (or subspecies ?) *L. discolor* (Sond.) Engl., and specimens of intermediate character occur, so that not only more thorough examination of material but also considerably fuller and more precise field notes are required before definite conclusions can be drawn about relationships and distribution in these south-eastern regions.

* *Note.*—A lens with a magnification × 15 is necessary adequately to resolve the indumentum of these two species, which are difficult to distinguish on the very young leaves, because the simple hairs of *L. kerstingii* are then more closely set and the stellate hairs approach in frequency those of the fruiting stage of *L. velutina*.

Citation of Material and Field Notes Seen, and of Types Recorded.

(Note : Herb. I.F.I. = Imperial Forestry Institute Herbarium.)

L. schimperi (*Hochst. ex A. Rich.*) *Engl.*

Senegal. *Boivin* s.n. (Herb. Kew!).

Nigeria. Abinsi, *J. M. Dalziel* s.n. (Herb. Mus. Brit. ! ex Edinb.); Maska, 20 miles north of Zaria, *Foster* 9 (Herb. Kew !) fl. 9 Feb. 1915. Sokoto Province : Zamfara Forest Reserve and neighbourhood, about 9 miles E.S.E. of Zurmi at foot of Dutsen Bagai, *R. W. J. Keay*, *For. Herb.*, *Ibadan No.* 16184 (Herb. I.F.I., Oxon. ! ex Ibadan) young leaves and fruits, 29 April 1946. Zaria Province : Basawa Communal Forest Area, about 8 miles N.W. of Zaria, *R. W. J. Keay*, *For. Herb. Ibadan*, *No.* 16108 (Herb I.F.I., Oxon. ex Ibadan), young and old leaves and frts. (some in spirit), 7 April 1946. Bauchi Province: *Conservator of Forests* in *Herb. I.F.I. No.* 2663 (Herb. I.F.I., Oxon. !), male inflors. on leafless branchlets, no date ; Ado, *Rowland* s.n. (Herb. Kew !) inflors. only. Eastern Provinces : Enugu Forest Reserve, *J. Smith* 12 (Herb. I.F.I., Oxon. !) young fruit, Nov. 1928; Enugu, 700 ft. alt., *Cons. of Forests* 48 (Herb. I.F.I., Oxon. !) frt. and young leaves, 13 March 1926 ; Enugu Forest Office, 650 ft. alt., *Cons. of Forests* 49 (Herb. I.F.I., Oxon !) male fls. and semi-mature lvs., 26 Feb. 1926 ; Abakaliki, 600 ft. alt., *Cons. of Forests* 123 (Herb. I.F.I., Oxon. !), male flowers and semi-mature lvs., May 1926.

Cameroons. Sansana-Kongola, 5° 30′—6° N., 13° 45′—14° E., 750–800 m. alt., *Mildbraed* 8977 (Herb. Kew ! ex Berlin), mature lvs. only, April 1914 ; Buar, 6° N., 15° 35′ E., c. 1,000 m. alt., *Mildbraed* 9489 (Herb. Kew ! ex Berlin), mature lvs., no date. Cameroons, no precise locality, *Mildbraed* 10105 (Herb. Kew ! ex Berlin).

Ubangui-Shari-Chad. East Shari : " Pays de Snoussi," Ndelle, c. 8° 25′ N., 20° 32′ E., *A. Chevalier* 7617 (Herb. Kew !), fl. 27 Feb. 1903.

Abyssinia. Tigre, *Capt. Pullen* 566 (Herb. Kew !), frt. June. Shoa, *Schimper* 1282 (Herb. Kew !, Herb. Mus. Brit. !, Herb. Fielding, Oxon. !), type of male fls. ex num., 21 March 1840. Jelajerane (" Dschelad-scheranne "), *Schimper* 657 (Herb. Kew !, Herb. Mus. Brit. !), type of female fls. and fruit ex num., June. Gobelli Valley, 5,000 ft. alt., *J. B. Gillett* 5263 (Herb. Kew !), frt., March, 1933.

Anglo-Egyptian Sudan. Red Sea Province: Erkowit, *Mrs. Crowfoot* s.n. (Herb. Kew !), a fragment, frt. March. Kassala Province : Gallabat neighbourhood, *Schweinfurth* 1276 (Herb. Kew ! , Herb. Mus. Brit. !), frt. June. Nuba Mts. Province: El Geybish, *N. D. Simpson* 7781 (Herb. Kew !). Southern Kordofan Province: Jebel-el-Daier, *J. Longe* 59 (Herb. Kew !). West Equatorial Province: Western District, near a tributary of the Boro River, between Jebel Manda and the source of the Boro, *Hoyle* 513 (Herb. I.F.I., Oxon. !), young frt. and young lvs., 24 Jan. 1939; Raga-Said Bundas Road, Minamba Rest House, near Ringi Hills, *Hoyle* 441 (Herb. I.F.I., Oxon. !), female fls. and very young lvs., 18 Jan. 1939; west of village just west of the crossing of the Kuru River on the Wau-Raga Road, *Hoyle* 545 (Herb. I.F.I., Oxon. !), male fls.

and young lvs., 31 Jan. 1939. Aweil District, Aweil-Nyamlell Road, c. 10 miles from Aweil, *Hoyle* 600 (Herb. I.F.I., Oxon. !), male inflors. on leafless branchlets, 14 Feb. 1939; same road, c. 3 miles from Aweil, 1 mile S.W. of Mapare Village, *Hoyle* 612 (Herb. I.F.I., Oxon. !), male inflors. on leafless branchlets, 15 Feb. 1939 ; near the last, *Hoyle* 613 (Herb. I.F.I., Oxon. !), male inflors. on leafless branchlets, same date. Wau District, Wau–Chak Chak Route, Khor Bom, *Broun* s.n. (Herb. Kew !), young frt. March ; Nyin Akok, *Turner* 111 (Herb. Kew !), frt., 21 Feb., 1935 ; Ngowlima, 15 miles S.W. of Wau, ridge north of Rest House, *Hoyle* 567 (Herb. I.F.I., Oxon. !), male inflors. in bud, on leafless branchlets, 6 Feb. 1939 ; Wau–Meshra Road 4–6 miles from Wau, long slope by road, *Hoyle* 585 (Herb. I.F.I., Oxon. !), male inflors. on leafless branchlets, 7 Feb. 1939. South-west Equatorial Province : Lado, Yei River, *Sillitoe* 332 (Herb. Kew !). " Bahr-el-Ghazal," no precise locality, *Broun* 916 (Herb. Kew !).

Uganda. Northern Province : Chua District, Kitgum–Aswa River Road, *W. J. Eggeling* 855 (Herb. Kew !), fl., no date. West Nile District, Pyeda, 4,500 ft. alt., *Tothill* 2591 (Herb. Kew !); Uleppi, *Eggeling* 1955 (F. D. 1578) (Herb. Kew !, Herb. Mus. Brit. !, Herb. I.F.I., Oxon. !), young frt., March. Western Province : Ankole District, Gayaza, Ruamfara, 4,750 ft. alt., *Eggeling* 631 (Herb. Kew !), frt., Oct. Eastern Province: Karamoja District, Timu Area, *Brasnett* 110 (Herb. Kew !), young frt., no date. Teso District, Serere, 3,600 ft. alt., *Chandler* 656 (Herb. Kew !), fls. March. Bugishu District, Bukonde, Mt. Elgon, 4,000–5,000 ft. alt., *Snowden* 851 (Herb. Kew !, Herb. Mus. Brit. !), young frt., March. Buganda Province: Mubende District, Bukomero, Singo, *Eggeling* 486 (Herb. Kew !), fls., August. Province ? District ? Buweguzo, 3,500 ft. alt., *Snowden* 223 (Herb. Kew !, Herb. Mus. Brit. !), frt., no date; Mpogo, c. 4,000 ft. alt., *Dümmer* 4373 (Herb. Kew !), fls., Jan. Without locality, *Eggeling* 1161, 1643 (Herb. I.F.I., Oxon. !); *H. R. Webb* 48 (Herb. I.F.I., Oxon. !), male fls. and detached old lvs., March 1938. Western Province: Ankole, *Bagshawe* 267, type of *L. rufescens* Engl. var. *bijuga* Bak. f., probably belongs here, fide *Eggeling*, Indigenous Trees of Uganda, 5 (1940).

Kenya Colony. Mount Elgon, 6,000 ft. alt., *I. R. Dale* F.D. 3204 (Herb. Kew !, Herb. I.F.I., Oxon. !), branchlets, young frts. and young lvs., March 1934.

Tanganyika Territory. Bukoba Province : Bukoba District, Sunssu, Karagwe, *H. Gillman* 145 (Herb. Kew !), fls. and young and old lvs., 13 Sept. 1934. Central Province : Kondoa District, Sambala, 4,900 ft., *B. D. Burtt* 2160 (Herb. Kew !), inflors. on leafless branchlets. Dodoma District, Mpwapwa, 3,500 ft., *H. E. Hornby* 407 (Herb. Kew !), fls. and detached mature lvs., 3 Jan. 1932. Tanga Province : West Usambaras, Makuyuni district, *Koritschoner* 1530 (Herb. Kew !), frts. and mature lvs., no date. Iringa Province : Mbeya District, Mbozi, *V. F. Jessel* 47 (Herb. Kew !), frt. and young lvs., no date. Rungwe District (" Kyimbila "), Massoko, *Stolz* 1008 (Herb. Kew !), young infructescences and part of young leaf, 27 Nov. 1911; same district, without precise locality, *Stolz* 1570, fls., frts. and fragments of young lvs., 1603, frts. and young leaves, 1638, frts. and semi-mature lvs., types of *L. stolzii* Engl. et v. Brehm. ex

num. (all in Herb. Kew ! and Herb. I.F.I., Oxon. !). Iringa District (?), Tanangosi, 5,300–5,800 ft. alt., *Dr. Gordon Brown* H54/33/9 (Herb. Kew !), fls. and young lvs., 30 Nov. 1933.

Belgian Congo. Urundi, in a valley of one of the rivers running into the Ranzigirra Lake, *von Trotha* 71 (Herb. Berol. ?, not seen), sterile, with young and old lvs., Sept., type of *L. rufescens* Engl., probably belongs here, e descript.

Field Notes.

Flowers: the common, early-flowering species (*Hoyle* 612); buds yellowish green (*Hoyle* 567); spikes pale greenish yellow (*Hoyle* 441); greenish golden yellow (*Hoyle* 600); yellow just before falling (*Hoyle* 545); spikes pendulous (*Hoyle* 585); bright yellow (*Eggeling* 486); yellow (*Eggeling* 855); yellow, preceding leaves (*Chandler* 656); yellow, fragrant (*Dümmer* 4373); pink* (*Webb* 48); reddish* (*H. E. Hornby* 407).

Fruits: (young) pale green (*Keay* 16108); (unripe) red-flushed on green (*Hoyle* 513); young fruits greenish (*Snowden* 851); ripening fruit pinky green (*Dale* 3204).

Foliage: young leaves pinkish buff-coloured (*Hoyle* 441); pink-tomentose, soon turning light green above (*Hoyle* 545); pinkish when young (*Snowden* 851, *Brasnett* 110).

Bark: dark grey, rather rough (*Turner* 111); dark brown, deeply fissured (*Keay* 16184); darkish grey, rough, exfoliating slowly in rectangular scales (*Hoyle* 585); nearly black, rough, scaly (*Hoyle* 600); dark, rough, longitudinally fissured and square-reticulate, inner bark yellow-white, soft, not stringy (*Hoyle* 612); bark more striate than 612, and inner bark more stringy, " may be only natural variation or younger tree " (*Hoyle* 613); bark light grey, blaze white (*Webb* 48); smooth, grey (*H. E. Hornby* 407); grey (*Dale* 3204).

Habit: tree (*Webb* 48); small tree (Enugu, *J. Smith* 12, Lagos, *Rowland* s.n., *Eggeling* 486, *B. D. Burtt* 2160, *Hoyle* 513); low tree 6–8 ft., widely few-branched (*Hoyle* 441); bole usually short (*Turner* 111); small, spreading-crowned tree (*Hoyle* 545, 600); tree 10 ft. (*Keay* 16108); small tree 13 ft. (*Dale* 3204); straggling tree to 15 ft. (*Brasnett* 110); tree 15 ft. (*Eggeling* 631, *H. E. Hornby* 407); tree 15 ft. by 18 in. girth (*Keay* 16184); tree 10–20 ft. (*Snowden* 851); small tree to 20 ft. (*B. D. Burtt* 2160) ; tree 20–25 ft. (*Chandler* 656); rather slender tree with spreading crown (*Hoyle* 585); deciduous tree 30 ft. (*Dümmer* 4373); usually 15–25 ft. high (general notes with *Hoyle* 545, 585); tree to 50 ft. (general note with *Cons. of Forests, Enugu* 48, 49 and 123).

Habitat: in savanna (Enugu, *J. Smith* 12); on poor lateritic soil throughout the savanna forests (general note with *Cons. of Forests, Enugu* 48, 123); on moderate red earth soil (*Cons. of Forests, Enugu* 49); in lower storey of open part of *Isoberlinia doka* woodland (*Hoyle* 545); on broken ironstone soil (*Hoyle* 567); long slope on ironstone soil (*Hoyle* 585); in *Isoberlinia* savanna pollard regrowth (*Keay* 16108); in open

* These discrepancies in flower-colour are matched by discrepancies in the description of the bark of these specimens; " pink " and " reddish " presumably refer to the indumentum, the most conspicuous feature of the young flower-spikes.

savanna woodland with *Bauhinia reticulata*, *Sterculia setigera*, *Lannea acida* and *Balanites* (*Keay* 16184); in mixed dry deciduous savanna woodland with *Anogeissus schimperi*, *Pterocarpus abyssinicus*, *Terminalia macroptera* and *Combretum spp.*, between edge of ironstone and *Anogeissus* woodland (*Hoyle* 600); in dry deciduous " ironstone " savanna woodland (*Hoyle* 612, 613); on rocky hillside (*Eggeling* 631); in open country with scattered trees (*Tothill* 2591); on rocky outcrops (*Dümmer* 4373); common in *Berlinia* (=*Isoberlinia*)—*Brachystegia* woodland (*B. D. Burtt* 2160); in gravelly soil on hillside, fairly common (*H. E. Hornby* 407); in savanna with *Combretum splendens*, *Acacia seyal*, etc., to be found from Eldoret to Koru and to Mt. Elgon, not common (general note on *Dale* 3204); dry conditions, sandy loams, *Combretum—Acacia—Themeda* (*Gillman* 145).

Vernacular names :

Northern Nigeria (Hausa): Faru (*Cons. of Forests, Bauchi, in Herb. I.F.I., Oxon.* No. 2663); Farun Doya (*Keay* 16184).

Tanganyika Territory (West Usambaras): Mwongo (*Koritschoner* 1530).

L. kerstingii *Engl. et Krause.*

French Sudan. Ouassaia*, *A. Chevalier* 521 (Herb. Chev.), type of flowers, 3 March 1899.

Ivory Coast. Haut Sassandra : Pays des Dyolas, Mt. Boho, near Zoanlé, *A. Chevalier* 21492 (Herb. Kew !), frt., 6 May 1909. Comoé Valley, Village of Yabarasso, *A. Chevalier* 22546 (Herb. Kew !), fls., 12 Dec. 1909.

Gold Coast. Northern Territories : Yagbung to Nabiungo, *Kitson* 745 (Herb. Kew !), lvs. only, May 1927; Wiasi, 500 ft. alt., *C. Vigne* 4484 (Herb. Kew ! Herb. I.F.I., Oxon. !), frt., March 1938; Lawra, 1,000 ft. alt., *C. Vigne* 3915 (Herb. I.F.I., Oxon. !), semi-mature lvs., May 1935. Ashanti: 7 miles north of Abofuo, 800 ft. alt., *C. Vigne* 1811 (Herb. I.F.I., Oxon. !), fls., Feb.; West Ashanti, Fiapere, *Chipp* 80 (Herb. Kew !), fl., 5 Feb. 1912.

Togoland. Near Sokode, *Kersting* 68a (Herb. Berol. ?), type of fruit.

Nigeria. Yola, *Dalziel* 178 (Herb. Kew !), branchlets, young lvs. and detached old lvs., 25 April, 1909. Kabba Province : Okene, fuel-wood plantation Compt. 4a, *Symington, For. Herb., Ibadan No.* 5662! Oyo Province: Oyo District, Old Oyo Forest Reserve, ¾ mile west of R. Tessi camp on slope, in open savanna woodland, *R. W. J. Keay, For. Herb., Ibadan No.* 16262 (Herb. I.F.I., Oxon. ! ex Ibadan), ♂ fls. on leafless branchlets, bark, 13 Feb., 1946; same locality and date, *Keay, For. Herb., Ibadan No.* 16264 (Herb. I.F.I. Oxon. ! ex Ibadan), ♀ fls. and frts. on leafless branchlets, old lvs. from ground ; fls., and frts. in spirit collection (Oxon. and Ibadan); branchwood correlated.

Cameroons. Mbussa west of (?) Kunde, 6° N., 14° 20′ E., 8–900 m. alt., *Mildbraed* 9096 (Herb. Kew !), frt. end of April, 1914. North of Lom River, 13° 40′ E., 700–750 m. alt., *Mildbraed* 8913 (Herb. Kew !), frt. end of April, 1914.

* There is a discrepancy in the spelling of this locality. Engler's description has " Onassain," while *Chevalier* (Bot., 159) is the source of the spelling used here and of the notes, quoted below, which he records as attached to *Chevalier* 521.

Anglo-Egyptian Sudan. Nuba Mountains: Heiban, *Burnett* 15 (Herb. Kew !), fls. when leafless, 27 March, 1933. Gebel near Gebel Zerâf, *N. D. Simpson* 7706 (Herb. Kew !), young lvs. only, 1 April, 1930. Blue Nile, Khor Dahat, *G. Aylmer* 9 (Herb. Kew !), fls. 2 March 1922. Wisko, *G. Aylmer* 33 (Herb. I.F.I., Oxon ! ex Herb. Sudan), mature lvs. only, 12 Dec., 1929. West Equatorial Province: Wau District, Jur River, Gereinti, *G. Aylmer* 27/49 (Herb. Kew !), old leaf only, no date; Nyin Akok, *Turner* 110 (Herb. Kew !), fls. before lvs., 21 Feb. 1935; ridge-road, east of Jur River, from Wau–Meshra Road to Nyin Akok, 1 mile from Meshra Road, *Hoyle* 597 (Herb. I.F.I., Oxon. !), fls. and very young lvs., 10 Feb., 1939; Wau–Meshra Road 4–6 miles from Wau, *Hoyle* 586 (Herb. I.F.I., Oxon. !), fls. on leafless branchlets, 7 Feb., 1939. South West Equatorial Province: Wau–Tembura Road, by Mabou Rest House, in remnant of cleared savanna woodland, *Hoyle* 682 (Herb. I.F.I., Oxon. !), frt. and mature lvs., 7 March, 1939. " Bongoland," Gir, *Schweinfurth* 1520 (Herb. Kew !), frt., 7 April, 1869; between Dokuttu and Tsabbi, *Schweinfurth* 2807 (Herb. Kew !), fls., 15 Jan., 1870. " Djurland," Gr. Seriba Ghattas (Tonj ?), *Schweinfurth* 2078 (Herb. Kew !), mature lvs., July. Loka, Mt. Gumbiri, *Myers* 8377 (Herb. Kew !), fls., 28 Jan., 1938. Li Yabongo, *Wyld* 49 (Herb. Mus. Brit. !), frt., Feb. East Equatorial Province: Payito, 32° 40′ E., 3° 80′ (sic) N., c. 4,600 ft. alt., *Chipp* 25 (Herb. Kew !), fls. and young lvs., 6 Feb., 1929.

Uganda. Northern Province: West Madi District, Leli, 2,500–3,500 ft. alt., *Forest Ranger Byasi* 1 (Herb. I.F.I., Oxon. !), semi-mature lvs. only, 19 March, 1945; Lango District, Lira Arboretum, *F. C. Hummell* 605 (Herb. I.F.I., Oxon. !), one old leaf, 26 Aug., 1944. Gulu District, Offu, 3,000 ft. alt., *Hancock* 752 (Herb. Kew !), frt. and detached mature lvs., no date; Aswa River, Gulu–Kitgum Road, *Eggeling* 779 (Herb. Kew !), fls. and young and semi-mature lvs., no date. Western Province: Bunyoro District, Busingiro, 3,800 ft. alt., *Harris* 78 (F.D. 643) (Herb. Kew !), frt. and detached semi-mature lvs., March; Bunyoro, *Dawe* 806 (Herb. Kew !), fls., very young frts. and old lvs., no date. Eastern Province: Teso District, Serere, c. 3,600 ft. alt., *Chandler* 581 (Herb. Kew !, Herb. Mus. Brit. !), frts., young leafy shoot and old detached leaf, March 1932; *Chandler* 582 (Herb. Kew !), fls. and young and mature lvs., March 1932.

Field Notes.

Flowers: when leafless, yellow (*Vigne* 1811, *Chevalier* 521); in long, pendent, yellow spikes clustered at ends of branches (*Eggeling* 779); small, yellowish (*Chandler* 581, 582); greenish (*Turner* 110, *Myers* 8377); always later in flower than No. 585 (*L. schimperi*), buds green, in pendulous spikes (*Hoyle* 586); strongly syringa-scented (*Chipp* 25); male inflorescence-axis, flower buds and petals greenish yellow, calyx darker yellow, filaments cream, anthers yellow (*Keay* 16262); female inflorescence-axis, calyx and petals greenish yellow, ovary green tinged red above, stigmas cream (*Keay* 16264).

Fruits: (unripe) green, fleshy (*Hoyle* 682); brick-red, suffused green below (*Keay* 16264); dull purplish when ripe (*Chandler* 581).

Foliage: leaf-buds with greenish brown indumentum, leaves (old, dried) reddish brown with whitish indumentum (*Keay* 16262, 16264); mature leaves deep green above, tawny beneath (*Hoyle* 682).

Bark: white (*Chevalier* 521); smooth, silver-grey with pronounced spiral twist (*Hoyle* 586, 597); with perceptible twist invariably present (*Hoyle* 682); pale grey, lightly furrowed in spiral fashion (*Myers* 8377); grey, smooth (*Aylmer* 33); spirally striate (*Chipp* 25); shallow fissures in the light grey bark often run spirally (*Turner* 110); bark deeply fissured [old tree ?] (*Harris* 78); pale green, anastomosing fissures tending to be spiral, outer bark 4 mm. thick, brown, inner bark 10 mm. thick, very fibrous and stringy, pink with white, sap becoming dirty-bluish, sapwood cream (*Keay* 16262).

Habit: tree (*Vigne* 1811); shrub 4–5 m. high or tree 10 m. high (*Chevalier* 521); small tree (*Chipp* 80, *Symington, For. Herb., Ibadan No.* 5662); stem 15 ft. with big, spreading crown (*Harris* 78); small, spreading tree (*Dawe* 806); fairly large tree, bole usually runs straight and branchless for 15–20 ft. (*Turner* 110); large tree (*Aylmer* 33, *Myers* 8377); large spreading tree (*Burnett* 15); tall tree (*Chipp* 25); lofty tree (*Wyld* 49); tree 25 ft. (*Keay* 16262); tree, usually 25–30 ft. but up to 40–50 ft. (*Hoyle* 597); tree 30 ft. high and 3 ft. girth (*Vigne* 3915, 4484); tree 30–40 ft. (*Chandler* 581); tree 40 ft. (*Schweinfurth* 2078, *Chandler* 582); clear trunk to 30 ft. (*Hancock* 752); tree 40 ft. high and 2 ft. girth at breast height (*Keay* 16264); tree 30–50 ft. with spreading flat-topped crown (*Hoyle* 682); taller tree than No. 585 (*L. schimperi*), more erect branching, with straighter trunk and more elegant habit (*Hoyle* 586); tree 60 ft. (*Eggeling* 779).

Habitat: open land (*Dawe* 806); savanna (*Forest Ranger Byasi* 1); savanna forest (*Vigne* 1811, 3915, 4484); savanna open woodland (*Symington, Forest Herb., Ibadan No.* 5662); common throughout Li Yabongo district, Sudan (*Wyld* 49); frequent in khor (*Myers* 8377); frequent, almost invariably associated with no. 585 (*L. schimperi*); in deciduous "ironstone" savanna woodland (*Hoyle* 586); on rocky soil (*Aylmer* 33); in tall-grass woodland over mountainside, common in fire-swept country (*Chipp* 25); on grassy hillside (*Harris* 78); in *Terminalia*—other species woodland or near streams (*Hancock* 752); open savanna woodland with *Uapaca somon, Daniellia, Butyrospermum* and *Cussonia* (*Keay* 16262); open savanna woodland with *Uapaca somon, Isoberlinia doka*, etc. (*Keay* 16264).

Vernacular names:

Northern Nigeria (Hausa): Faru (*Dalziel* 178).
French Sudan: Bembe (*Chevalier* 521).
Uganda (Madi): Azu (*Forest Ranger Byasi* 1).

L. velutina *A. Rich.*

Senegal. *Heudelot* 992 (Herb. Kew !, Herb. Fielding, Oxon. !).

Gambia. Bulak, *Rosevear* 37 (Herb. I.F.I., Oxon. !), lvs. only; Albreda, *Leprieur*, type, fr. May.

French Sudan. Bamako, *Hagerup* 36 (Herb. Kew !), fls. and young lvs., 26 April, 1927.

Portuguese Guinea. Without precise locality, *Joachim Viegas* 499 (Herb. Kew ! ex Jard. Col. de Lisboa), frt. and semi-mature lvs., no date.

Gold Coast. Northern Territories: Tumu, *C. Vigne* 3788 (Herb. I.F.I., Oxon. !), frt., April 1935; Dimshi, *Kitson* 644 (Herb. Kew !), semi-mature lvs. only, 14 April, 1927; Pan to Bujan, *Kitson* 652 (Herb. Kew !), semi-mature leaf only, and 646 (Herb. Kew !), frt. and detached semi-mature lvs., both dated 18 April, 1927; Dubba to Terriwama (or Jerriwama ?), *Kitson* 945 (Herb. Kew !), fls. and young lvs., 16 March, 1927.

Habit, etc.: large tree (*Kitson* 644); tree 20 ft. by 1 ft. girth in savanna forest (*Vigne* 3788).

Vernacular name (Gambia): Bembo (*Rosevear* 37).

A. Chevalier (Bot. 159) cites the following numbers under *L. velutina*. Since one of them has perhaps the fullest notes of any specimen recorded or available, we quote them here.

French Guinea. Kollangui, *Chevalier* 12225 (fls. ?), March 1905; between the Konkouré and Timbo, *Chev.* 12871, 13577 (fls. ?), March, 1905; " route de Longuery," 14830 (*O. Caille*), fls., 1 Dec., 1905.

Obs.—Tree 6 m. high, with yellow flowers (no. 14830).

We are grateful to our colleague, Mr. J. P. M. Brenan, of the Department of Forestry, Oxford University, for the valued expression of his critical opinion at various stages of this investigation.

The subject has been treated much more fully than is (unhappily) customary, because of the amount of confusion which exists, and also because of the undoubted importance of species of *Lannea* in the ecological study of dry-zone vegetation in North and East Tropical Africa.

Since the above was written, and before its publication was possible, a very interesting and instructive paper on " Les *Lannea* de l'Afrique occidentale française," by A. Aubréville (L'Agronomie Tropicale **1,** 3–4, 125–137 : 1946), was received through the good offices of Professor Normand of Paris. The treatment of the dry-zone species in this paper is admirable, except where M. Aubréville seems to have been misled by the mixture in the type material of *L. barteri*, which is the chief subject of the present account. If, throughout M. Aubréville's paper, the name *L. kerstingii* is substituted for *L. barteri*, then we are in complete agreement with him, in so far as we have seen the material he cites.

Species of *LANNEA* Discussed in this Paper

L. barteri (Oliv.) Engl.—nomen confusum. Fls. = *L. schimperi*; leaves = *L. kerstingii*.

L. discolor (*Sand.*) *Engl.*—A valid species, though very closely related to *L. schimperi* and perhaps only subspecifically distinct.

L. kerstingii *Engl. & Krause.*—A valid species, though closely related to *L. velutina*.

L. rufescens Engl. e descr. = L. schimperi.

L. schimperi (*Hochst. ex A. Rich.*) *Engl.*—A valid species.

L. sessilifoliolata Engl. = L. kerstingii.

L. stolzii Engl. & v. Brehm. =L. schimperi.

L. velutina *A. Rich.*—A valid species.

NEW PLANTS FROM THE NEARER EAST.

M. Zohary and P. H. Davis.

1. Sonchus

A remarkable woody *Sonchus*, apparently endemic to cliffs in the Judean Desert and Moab, appears to have eluded the earlier botanists. The species now described is an exceptionally interesting one, not only ecologically but also in its habit and taxonomy, presumably constituting a link between *Lactuca* and *Sonchus*.

The dividing line between these two genera is a difficult one to draw, the beaked nature of the achene in *Lactuca* having several exceptions in the Near East. G. Ledyard Stebbins, Jr., in " Critical Notes on *Lactuca* and Related Genera " (Journ. Bot. 1937, p. 12), states of *Lactuca* that " the achene is definitely flattened, and has two strong lateral ribs or wings, with a varying number of lesser ribs on each face. Whether beaked or not, moreover, it possesses a strongly expanded pappus disk." The achenes of *Sonchus*, on the other hand, " are flattened or four-sided, as are those of *Lactuca*, but lack the expanded pappus disk."

Despite its unusual habit and shortly attenuated achenes (reminiscent of some *Lactuca*), we have decided to place our plant in *Sonchus* owing to the absence of an expanded disk. It should be noted that *S. pustulatus* Willk. [S. *tenerrimus* L. ssp. *pustulatus* (Willk.) Bat.] and the microspecies *S. dianae* Lacaita are somewhat suffrutescent chasmophytes from N. Africa and Spain. These have truncated achenes of typical *Sonchus* shape, but they possess several vegetative characters (such as the wool in the axils of the leaves) which are found also in our plant. In its woody habit, and even in the form of its leaves, *S. pinnatifidus* Cavanilles, from the rocks of S.W. Morocco and the Canaries, shows some resemblance to the plant here described, and confirms our view that the new species is better placed in *Sonchus* than in *Lactuca*. It must, however, be considered a very isolated type, and, though its nearest affinity may be with the *S. tenerrimus* L. group, it seems advisable for the present not to relate it to any species previously described.

Sonchus suberosus *Zohary et Davis* sp. nov.

Species insignis, saxatilis, suffrutescens. Probabiliter inter *Sonchum* et *Lactucam* species intermedia est.

Planta suffruticosa, a basi lignosa, foetida. *Caulis* lactifer, inaequaliter ramosus, usque 40 cm. altus et 2 cm. crassus, valde suberosus ; suber longitudinaliter fissum. *Rami* hornotini, 30–70 cm. longi, 2–7 mm. crassi, teretes, eburneo-albi, lucentes. *Folia* oblonga, runcinato-pinnatifida, 5–10 cm. longa (inferiora saepe longiora), glabra, 6–12-lobata ; lobi laterales ovato-oblongi vel lanceolati, irregulariter dentati, terminalis latior, ovato-triangularis. *Folia* vernalia alterna, remota, petiolata, petiolo basi dilatato vaginato et semiamplexicauli ; folia autumnalia 5–7 fasciculata in axillis foliorum vernalium lanigeris disposita. *Cymae* paniculatae, ex axillis foliorum vernalium enatae ; interdum inflorescentia ad capitulum unicum reducta. *Pedunculi* ± elongati, superne foliolis remotis minutis lineari-lanceolatis praediti.

FIG. 1.—*Sonchus suberosus* Zohary et Davis sp. nov. a, general habit of the plant ($\times \frac{3}{10}$); b, c, capitulum (nat. size); d, floret ($\times 2$); e, achene ($\times 3\frac{1}{2}$); f, single hair of pappus (much enlarged); g, cross section of achene ($\times 12$).

Capitula multiflora, 2–3 cm. diametro. *Flosculi* lutei, inferne hirsuti. *Involucrum* ± campanulatum, ca. 10 mm. longum et 5–6 mm. basi latum ; phylla exteriora ad quadrantem vel ad duas partes longitudinis phyllorum interiorum, interiora superne minute ciliata, obtusa, apice recurva. *Receptaculum* nudum. *Achaenia* glabra, conformia, elliptica, ± compressa, 4 mm. longa, vix 1 mm. lata, fusca, ca. 12-striata, 3–4 -costata, transverse vix rugosa, apice breviter attenuata, erostrata, disco haud expanso. *Pappus* albus, deciduus, achaenio aequilongus vel parum longior ; setae conformes, tenues, flexuosae, sub lente setoso-denticulatae. Floret Oct.-Febr.

Palestine. Judean Desert : Wadi Qelt cliffs, 1931, 1932, *Eig* ; ibidem, 1941, *Daniel Zohary* ; Wadi Haritun, S.E. of Bethlehem, 1942, *Davis et Kushnir* (type); Jebel Qarantal cliffs, 1942, *Davis*.

Transjordan. Moab : Wadi Zerka Maïn, 1945, *Davis* ; Wadi Heidan cliffs, 1945, *Davis*.

Type in Herb. Hebr. Univers., Jerusalem. Co-types in Herb. Kew.

Sonchus suberosus is woody at the base (more so than *S. pustulatus* Willk.) the wood being covered by an elastic corky substance. In the early spring new stems, bearing alternate leaves only, grow up from the base, but at the approach of summer these shed their leaves and the plant looks dead throughout the dry season. In the early autumn clusters of leaves and inflorescences develop in the axils of the dead foliage. The large flowers continue to bloom throughout the winter. After seeding, these branches die back towards the base and only their lower parts become woody, from which arise new branches the following season.

The plant occurs chiefly in the Irano-Turanian territory of the Judean Desert and Moab, where it is confined to cliffs, generally of hard Cenomanean limestone and preferably in complete shade ; it ranges from sea-level to about 650 m.

In Wadi Haritun (Judea) *Sonchus suberosus* is locally co-dominant in small vertical cracks and holes with *Podonosma syriaca* and *Centaurea eryngioides* ; while in Wadi Qelt it is found only in the narrowest parts of the chasm, where it grows with *Podonosma* and *Capparis aegyptiaca*. On the even drier rocks of Jebel Qarantal it is found in the same association, but is not as luxuriant as on the cooler rocks of Wadi Haritun. It is particularly abundant in Wadi Zerka Maïn (Moab), especially in association with *Podonosma* on the hard limestone, but also occurs there on local intrusions of Quaternary basalt with *Euphorbia thamnoides*.

Our plant may be considered a " rigid " Tertiary relict.

2. Ferula

The genus *Ferula* is one of those plant groups abundantly represented both in the Mediterranean and the Irano-Turanian countries of the Nearer East. There is, however, no doubt that the Irano-Turanian region constitutes the main and primary centre of this genus, and that the Mediterranean species are to be referred both genetically and historically to Irano-Turanian stock. Similar phytogeographical relations have been found for a series of Mediterrano—Irano-Turanian genera or subgeneric groups such as *Dianthus*, *Phlomis*, *Verbascum*, and

Asphodeline. This opinion is based, among other points, on the fact that the genera in question have produced many species in the Irano-Turanian Region and fewer in the Mediterranean Region.

In *Ferula* we find seven very restricted endemic species in the Syrian Desert and only two in the adjacent Mediterranean territory of Syria and Palestine. The same proportion of endemics is to be found in Turkey.

The section *Peucedanoides* Boiss. of the genus *Ferula* is the section most richly represented in our district, and the following two species from Palestine and Turkey also belong to this group.

Ferula (Sect. **Peucedanoides**) **amani** *Zohary et Davis* sp. nov.

A *F. cassii* Zohary et Davis* foliis minus decompositis, foliorum laciniis crassioribus magis divergentibus, vaginis oblongo-lanceolatis (non late ovatis), pedunculo umbellae centralis longiore differt. A *F. anatolica* Boiss. foliis dense hispidulis, dentibus calycinis obsoletis, vaginae forma divergit. A *F. cachroide* (Schlecht.) Zohary et Davis† laciniis divergentibus brevioribus latioribus dense hispidulis, umbellis centralibus pedunculatis inter alia recedit. A *F. orientali* L. (planta Tournefortii ad Erzerum collecta) laciniis brevioribus, vaginis oblongo-lanceolatis, stylis brevioribus discrepat. A *F. samariae* Zohary et Davis caulibus glaucescentibus, vaginis oblongo-lanceolatis, laciniis brevioribus dense hispidulis praeter alia signa distinguitur.

Perennis. *Caules* 1.5–2 m. alti, laeves, striati, superne glaucescentes, subverticillatim ramosi ; rami tenues, usque ad 20 cm. longi. *Folia* basalia 40 cm. longa, ambitu late ovata, griseo-viridia, longe petiolata ; petiolus superne incrassatus ; foliorum divisiones primariae oblongae petiolulis 5 cm. longis praeditae ; divisiones secundariae oblongo-ovatae ; tertiariae ovatae ; laciniae oblongo-lineares, acutae, margine revolutae, valde divergentes, griseo-virides, 1.5–2.5 mm. longae, 0.5 mm. latae, e toto cum parte rhachidis superiore dense hispidulae ; folia caulina vaginis turgidis coriaceis oblongo-lanceolatis striatis glaucescentibus 8–15 cm. longis, 2.5–4 cm. latis ; foliorum superiorum laciniae longiores et laxiores quam laciniae foliorum basalium. *Bracteae* plerumque binae, subulatae, 3–8 mm. longae, 1–1.5 mm. latae. *Involucelli* phylla triangulari-subulata, usque 2 mm. longa. *Umbella* centralis fertilis, 10–20-radiata, 8–10 cm. lata, pedunculis 5–12 mm. (rarius 40 mm.) longis, 2 mm. crassis, radiis 3–4 cm. longis ; umbellae steriles 2–4, longe pedunculatae. *Flores* ignoti ; calyx obsoletus. *Diachaenium* pedicello suo aequale, ellipticum, atro-fuscum, glaucescens, 9–10 mm. longum, 3.5–5 mm. latum, apicem versus parum inflatum ; styli stylopodio conico depresso 2.5–3-plo longiores ; juga interiora crassiuscula, approximata, exteriora in marginem crassum abeuntia ; alae ca. 1 mm. latae ; vittae latae valleculas implentes, commissurales binae.

Turkey. Amanus Mts. : above Karaksieh, 500–800 m. in a Pinetum Brutiae ; Achagi Zarkoun, about 1,800 m. in a Pinetum Brutiae and P.

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* **Ferula cassii** *Zohary et Davis*, nom. nov. *F. meifolia* (Fenzl) Boiss. Fl. Or. **2,** 984 (1872)—nec Eckl. et Zeyh. Enum. 348 (1835).

† **Ferula cachroides** (*Schlecht.*) *Zohary et Davis*, comb. nov. *Polycyrtus cachroides* Schlecht. in Linnaea, **17,** 126 (1843). *Ferula schlechtendalii* Boiss. Fl. Or. **2,** 985 (1872). (Haud *F. cachroides* Fisch. in Hort. Gorenk. ed. 2, 46 (1812), nom. nud. = *F. caspica* Bieb.)

Laricio (type); eastern slopes of ascent to Achagi Zarkoun, 1,000–1,500 m., all 1932, *Eig and Zohary*. Type in Herb. Hebr. Univers., Jerusalem. Co-type in Herb. Kew.

F. amani is both morphologically and geographically closely related to *F. cassii* Zohary et Davis from Mt. Cassius (Syria). In Pal. Journ. of Bot. 2: 170 (1941) some sheets of *F. amani* were erroneously referred to *F. meifolia* Fenzl (i.e. *F. cassii*).

Ferula (Sect. **Peucedanoides**) **samariae** *Zohary et Davis* sp. nov.

Affinis *F. anatolicae* Boiss., laciniis flaccidis divaricatis haud falcatis, vaginis stramineis (non glaucis), dentibus calycinis brevibus et triangularibus recedit. A *F. cachroide* (Schlecht.) Zohary et Davis laciniis longioribus divaricatis, involucellis persistentibus, vaginis minus inflatis divergit. A *F. orientali* L. (specimine Tournefortii) laciniis multo longioribus sparsim scabridulis, vaginis ovato-oblongis (non ample ovatis, haud cucullatis), stylis longioribus discrepat.

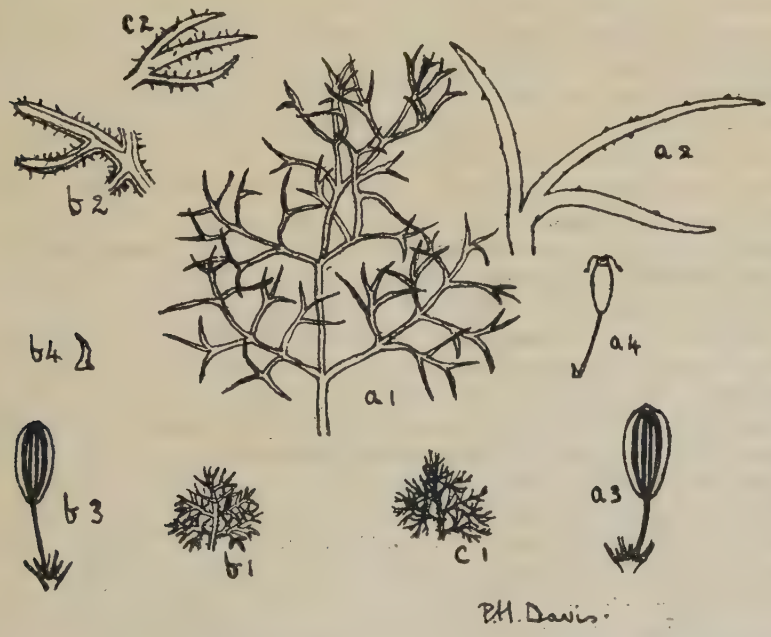

Fig. 2—a_1–a_4 *Ferula samariae* Zohary et Davis, sp. nov. a_1, leaf (×1); a_2, laciniae of leaf (×4); a_3, diachenium (×1); a_4, young fruit showing stylopodium and styles (×1).
b_1–b_4 *Ferula amani* Zohary et Davis, sp. nov. b_1, leaf (×1); b_2, laciniae of leaf (×6); b_3, diachenium (×1); b_4, involucel bract (×5).
c_1–c_2 *Ferula cassii* Zohary et Davis. c_1, leaf (×1); c_2, laciniae of leaf (×4).

Perennis. *Caules* 1–4-enati, 1–1.5 m. alti, laeves, striati, virides, superne subverticillatim ramosi. *Rami* usque 18 cm. longi, 2–3 mm. crassi. *Folia* basalia flaccida, ambitu late ovata, viridia, post anthesim evanida, 80 cm. longa; petiolus glaber, striatus, inferne incrassatus, in vaginam lanceolatam abiens; divisiones primariae ternatae, obovatae, petiolulis usque ad 10 cm. longis; divisiones secundariae obovatae,

petiolulis ad 8 cm. longis ; laciniae lineares, flaccidae, planae, parce scabrae, angulo acuto divergentes, plerumque 5–10 mm. longae, 0.3–0.5 mm. latae, acutae ; folia caulina vaginis ovato-oblongis turgidis membranaceis pallide stramineis striatis transverse venosis amplexicaulibus, 9–12 cm. longis, 5 cm. latis suffulta ; laciniis laxis, plerumque 1–3 cm. longis, 1 mm. maxime latis. *Bracteae* binae, oppositae, filiformes, acutae, 0.8—1.5 cm. longae, 0.5–1.0 mm. latae, deciduae. Involucri phylla obsoleta, decidua. Involucelli phylla triangularia vel triangulari-subulata, 1 mm. longa vel longiora. *Umbellae* 10–30-radiatae, 5–8 cm. diametro ; pedunculus centralis 2–4 cm. longus, 2–3 mm. latus ; radii plerumque 2–3 cm. longi, 1 mm. crassi ; umbellae externae steriles, 5–6 cm. longae. Flores lutei. Calycis dentes brevissimi triangulares petalis quadruplo breviores. *Fructus* pedicellis 5–10 cm. longis praediti, elliptici, pallide fusci (non glauci), ca. 11 mm. longi, 5–6 mm. lati, apicem versus parce inflati. Styli stylopodio depresso conico 2–2.5-plo longiores ; juga interiora tria, crassiuscula, approximata, exteriora in marginem crassam abeuntia ; alae 1 mm. latae vel paulo ultro ; vittae valleculas implentes ; commissurales binae. Floret Mart.-April.

Palestine. Hard limestone cliffs in Wadi Beidan near Nablus, 400 m., 1942, *P. H. Davis* 4580 (type); 4860. Type in Herb. Hebr. Univers., Jerusalem ; co-type in Herb. Kew.

This rare and handsome species is very distinct from any other Palestinian *Ferula*, and even resembles certain Anatolian species more closely than the only Syrian plant in this group—*F. hermonis* Boiss. The feathery, flaccid, pale-green leaves give the plant a superficial resemblance to *F. communis*, but the fruits place it at once in the *Peucedanoides* section. *F. samariae*, is, in fact, very isolated geographically, and is one of the rarest endemics in Palestine.

The new Ferulas belong to a group of species consisting of *F. anatolica* Boiss., *F. cachroides* Zohary & Davis, *F. cassii* Zohary & Davis and *F. orientalis* L., which are mostly inadequately described and without ripe fruits. Although these plants appear to be very close to one another it seems that Boissier was right in considering them as separate species each confined to a special geographical area.

On the other hand, Boissier in his Flora Orientalis appears to have merged several different Ferulas into one species—*F. orientalis*. This species was originally inadequately described and illustrated by Tournefort from material collected by him at Erzerum. Boissier described it anew in 1844 as *Peucedanum orientale* Boiss., and added several details not mentioned in Tournefort's original description. In his Diagnoses Plantarum Orientalium Novarum (1854–59) Boissier described another new *Peucedanum—P. rupestre*, collected in Cappadocia and formerly published as *F. rupestris* in Plantae Anatoliae Exsiccatae by Boissier and Balansa. He apparently considered this plant sufficiently distinct from *P. orientale*, etc., to make it a new species. Later, in Flora Orientalis, he united these two plants and also other slightly differing specimens from the Crimea and Caucasus under the name of *Ferula orientalis* L. In this way Boissier amplified the original description of Tournefort's plant from Erzerum to include the other specimens mentioned ; but, in spite of the mixed character of the description, Boissier, when referring to allied species in Flora Orientalis apparently took *F. orientalis* sensu lato as a basis

for comparison. Boissier's *F. orientalis* as understood by us is a collective species.

As regards other Ferulas of the *F. orientalis* group, we have examined specimens of *F. cassii* collected by Post from the *locus classicus*— Mt. Cassius—which fully agree with Boissier's description of that plant. We have also seen material from the environs of Belled el Sheikh near Antioch which we must tentatively retain as *F. orientalis* L. until this species has been revised. In Post's herbarium there is a plant named *F. meifolia* Fenzl (i.e. *F. cassii*) collected by him from " Karakillissa—Genskum " which may constitute another species near to *F. amani*; but the material is insufficient for description. Incomplete specimens determined by Freyn as *F. schlechtendalii* Boiss (i.e. *F. cachroides*) from Turkish Armenia (Kyl-Maghara-Dagh and Kota) by no means resemble the type in the Kew Herbarium.

F. amani, like *F. cassii*, is obviously a true Mediterranean species; *F. samariae*, however, grows on the Irano-Turanian edge of Palestine's Mediterranean zone. The slopes below the cliffs now support a decidedly Irano-Turanian vegetation, but a few remnants of *Quercus calliprinos* indicate a Mediterranean vegetation at a fairly recent date, and relict plants of such woodlanders as *Lonicera etrusca* and *Smilax aspera* on shadier parts of the cliff confirm this view.

3. Thymus

Thymus syriacus *Boiss.* subsp. **eigii** *Zohary et Davis* subsp. nov.

A *T. syriaco* ipso haec subspecies habitu robustiore minus glanduloso, foliis floralibus inferioribus majoribus late ovatis breviter acuminatis quam floribus longioribus, calycis dentibus tenuioribus inter alia divergit.

Caules lignosi, usque ad 2 cm. crassi. *Rami* floriferi inferni saepe horizontales, superni erecti, plerumque 15–20 cm. longi, 1–2 cm. crassi, quadrangulares, goniotrichii. *Folia caulina* lanceolata vel linearilanceolata, acuta, 2 cm. longa (vel paulo ultro), 2–6 mm. lata (nunc latiora), subsessilia, integra vel remote denticulata, rigida, plana vel plicata, glabra, margine scabriuscula, glanduloso-punctata, parte inferiore 7–9-nervosa et sparsim longe ciliata. *Inflorescentia* capitata, late ovata, ca. 2 cm. longa et lata. *Folia floralia* late ovata, breviter acuminata, interdum purpurea, inferiora 15 mm. longa, 7–10 mm. lata, floribus

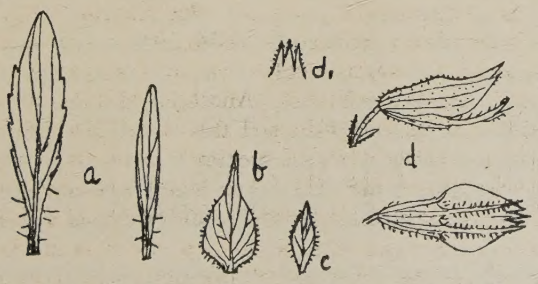

Fig. 3.—*Thymus syriacus* Boiss. subsp. *eigii* Zohary et Davis, subsp. nov.: a, stem leaves; b, floral leaf; c, bract; d, calyx; d_1, upper calyx teeth.

longiora, 9–12-nervosa, ciliata. *Flores* breviter pedicellati ; pedicelli 2–4 mm. longi. *Calyx* 6–7 mm. longus, saepe purpureus, pubescens, minutissime glandulosus, infra medium bifidus ; labium superius late ovatum, minute ciliatum, 3-dentatum ; dentes triangulari-lanceolati ; dens medius longior, labio plus quadruplo brevior ; labium inferius superiori aequilongum vel brevius, usque ad basin fissum ; dentes subulati, ciliati. *Corolla* exserta, usque ad 10 mm. longa, rosea, glanduloso-pubescens ; labia aequilonga, superius ovatum, emarginatum, inferius 3-lobatum ; tubus obconicus, calyci fere aequilongus. *Stamina* longe exserta, filamentis purpureis sparsim hirsutis.

Turkey. Amanus Mts : Prope Beilan, in adscensu ad vineta versus fontem Tschaush Kara, alt. 900 m., 1862, *Kotschy* ; above Karaksieh, 500–800 m., in Pinetum Brutiae, 1932, *Eig and Zohary* (type).

Syria. Between Belled el Sheikh and el Ourdou (S. of Antioch), on Cenomanian rocks in a *Quercetum infectoriae* and *Q. calliprini*, 1932, *Eig and Zohary*.

Type in Herb. Hebr. Univers., Jerusalem ; co-type in Herb. Kew.

T. syriacus subsp. *eigii* is superficially so distinct from *T. syriacus* as represented by material from the Baalbek district that at first we did not recognise it even as allied to that species. But it was considered as *T. syriacus* by Boissier ; in his Flora Orientalis he refers to Kotschy's specimens of *T. syriacus* from Amanus (which we have seen in the Kew Herbarium), remarking " forma bracteis majoribus, calycis dentibus longioribus." We have had the opportunity of examining a large series of specimens of *T. syriacus* from the environs of the Syrian Desert, and realise that this species is a very polymorphic one in every respect. Intermediate forms between typical *T. syriacus* and the subspecies described above are not rare. Nevertheless, the specimens from Amanus and Northern Syria are so distinct from typical *T. syriacus* that we consider them to deserve at least subspecific rank. The two plants are also separated ecologically ; the type is an Irano-Turanian element, whereas the subspecies is centred in the Mediterranean zone.

WILLIAM JACKSON BEAN, C.V.O., I.S.O., V.M.H.—The death of William Jackson Bean, formerly Curator of the Royal Botanic Gardens, Kew, occurred on April 19, 1947, within a few weeks of his eighty-fourth birthday.

Bean started life with few worldly advantages, and worked during his early years the arduous life of a garden apprentice, but he acquired very considerable eminence in his profession and the nation-wide respect and esteem of horticulturists. He had one initial advantage, for he was born and bred to horticulture, as were the three previous generations of his family. However, his father died when Bean was very young, and his training could not be guided from home. Born on May 26, 1863, in a village near Malton, at the foot of the Yorkshire Wolds, he was educated at Holgate School, York, leaving school at the age of sixteen to acquire training in the famous gardens at Belvoir Castle. At the age of twenty he entered the Royal Botanic Gardens, Kew, as a student gardener, with no fixed ideas for the future. George Nicholson, at that time Curator of the Gardens, who was ever ready to help aspiring young men, was impressed with the ability and earnestness of young Bean, and it was not long before he selected him for promotion. He served successively as sub-foreman of the Palm House and Orchid Houses, where he came under the notice of that strict disciplinarian, Thiselton-Dyer, then Director of the Gardens. When a vacancy occurred, Bean was appointed foreman of the Temperate House, and after occupying that position for five years he was transferred to the Arboretum as foreman in 1892. Some eight years later he was advanced to the post of Assistant Curator for the Arboretum and in 1900 he was appointed Assistant Curator of the Gardens. His promotion to Curator dated from 1922, and he relinquished the post on attaining the age limit in 1929.

Bean had the pen of a ready writer, and during his early days at Kew he was a regular correspondent of *The Garden* and *The Gardeners' Chronicle* when those journals were presided over by William Robinson and Dr. Maxwell T. Masters respectively. In 1890, he collaborated with the late William Watson in the authorship of a book on " Orchids, their Culture and Management ". About the time when he himself retired from Kew, Thiselton-Dyer recommended Bean for the preparation of a book descriptive of the Royal Botanic Gardens and the work of the establishment, which was published in 1908. At this time and during the following years Bean contributed numerous articles to the *Kew Bulletin of Miscellaneous Information*, and described a number of species of trees and shrubs in the Botanical Magazine. In 1908 he began his great work, " *Trees and Shrubs Hardy in the British Isles*," the first two volumes of which were published in 1914. Owing to the pressure of official duties the third volume could not be prepared until after his retirement, and it was published in 1933. For the last few years he has been engaged upon a new edition of " Trees and Shrubs " and on descriptive work on trees and shrubs for the new " *Dictionary of Gardening* " in course of preparation by the Royal Horticultural Society.

Mr. Bean undertook a number of official visits to various European countries on behalf of the Government. He also visited the Arnold Arboretum and other important establishments in the United States.

Had it not been for the outbreak of war in 1914 Bean would have gone to South Africa to advise about certain features in the lay-out of the Kirstenbosch Gardens. During the early part of the 1914–18 war he was seconded to the Ministry of Agriculture for a short period, but the work did not appeal to him. For several years he was a member of the committee appointed by King George V to advise on the trees in Windsor Great Park ; he was also a member of the Floral Committee of the Royal Horticultural Society, and had a seat on the Technical Committee of the Roads Beautifying Association. After his retirement he acted for a year or two in an advisory capacity to the latter body.

Bean was the recipient of many honours. For his work at Windsor he was made Commander of the Royal Victorian Order, and for his work at Kew he was awarded the Companionship of the Imperial Service Order. In 1918 the Royal Horticultural Society awarded him the Victoria Medal of Honour and later he was made an honorary Fellow of the Society. In 1923 the same body awarded him the Veitch Memorial Medal. When Mr. Ernest Moore, the artist, was preparing for his exhibition of portraits of famous Yorkshiremen, Mr. Bean was asked to sit as one of the number. The portrait was afterwards purchased by Mr. Reginald Loder and presented to Kew, where it hangs in the Gardeners' Library. Bean's earliest recreation was cricket ; later he took up both tennis and golf.

I was very closely associated with Bean for many years, first as his propagator and sub-foreman in the Arboretum, later as foreman of the Arboretum. Later still we had adjoining offices, after I was transferred to the Museums, and I could not wish for a better colleague. He had been a widower for many years, and leaves one son and one daughter to whom our sympathy is extended.

W. D.